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TO

THE MEMORY OF

HANS WILHELM MEYER,

WHOSE

UNTIRING WORK BETWEEN 1868 AND 1895

HAS BEEN THE MEANS OF

SAVING COUNTLESS CHILDREN FROM DEATH,

OR THE MISERIES OF DEAFNESS.

PREFACE.

I have endeavoured to collect in the following pages all that can be said upon the subject of adenoid vegetations of the nasopharynx. Therein will be found as complete an account of the history, pathology, symptoms, and treatment as it is possible to gather. It has more than once occurred to me that a disease which is so universal, which has such an enormous literature of its own, and which is of so much interest to all branches of our profession, ought to boast at least one book in the English language.

I have done my best to place before the reader the opinions of all or most of the authorities upon the subject, and upon these I have commented in the light of my own experience.

My best thanks is due to my friend, Mr. Bellamy Gardner, for adding so excellent a chapter as that upon the Choice of the Anæsthetic, a subject of great importance, as contributing to the success of operation; to Dr. Eastes, for undertaking at somewhat short notice the histological examination of a number of growths, and for certain photographs, I owe a similar debt of gratitude. I also take this opportunity to express my thanks to Drs. M'Bride and Logan Turner for the loan of Fig. 9, to Dr. Thompson, of Cincinnati, for that of Figs. 16, 17, and 18, and to Dr. Syers for his assistance in reading some of the chapters.

MACLEOD YEARSLEY.

10, Upper Wimpole Street, W.,
October, 1901.

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CHAPTER I.

HISTORICAL.

There can be no doubt that the paper which appeared in 1868, by Hans Wilhelm Meyer, marked an important epoch in the treatment of diseases of the ear in children, and not only in that of those diseases, but of many other childish symptoms and affections as well. Since that year the literature which has sprung up upon the subject is nothing short of enormous, yet, with one exception, there has been no book written in the English language which deals exclusively with the malady.

The term "Adenoids" has been chosen as a title for this work, because it is probably the designation most universally employed for the disease under discussion; it was, also, that used originally by Meyer. Of the synonyms, "Post-nasal Growths" is too loose a one, and might be used equally to denote any tumour growing in the post-nasal space, whilst "Hypertrophy of the Pharyngeal Tonsil," although it conveys the most accurate information as to what the growths really are, and we cannot be too particular in medical terminology in selecting for diseases names that are scientifically accurate in the meanings they are intended to convey, is too cumbersome for general use.

It has always been somewhat of a source of wonder to me that adenoids were not discovered much earlier in medical history, especially when one considers the number of original observers and the activity of original research, which obtained in the early days of the nineteenth century. The effects of adenoids are so obvious, and their pathological appearances so gross, that it is not a question of the want of accurate and delicate instruments. It is curious, to say the least of it, that men of such vast clinical experience and such exceptional pathological opportunities as, for instance, the Hunters, should have never seized upon so obvious and important an affection. Possibly they may have noted them, but neglected to pursue their investigation for want of time, passing them over for some other subject which they deemed to be of greater import.

Be the reasons for their late discovery what they may, it cannot be denied that adenoids form a pathological condition sufficiently obvious, and leaving traces markedly distinctive. This remark applies not only to modern times. Hypertrophy of the pharyngeal tonsil is not by any means a modern disease, for portraits have survived which clearly demonstrate that it existed, probably as commonly as now, among ancient peoples. In the last paper upon the subject that Meyer wrote, only a few months before his death, this fact was clearly pointed out. The paper referred to was an address delivered to the Copenhagen Medical Society, and was published in the "Hospitalstidenda" (February 6th and 13th, 1895), and was translated for the "Archiv. für Ohrenheilkunde" (December 30th, 1895). Searching the Museo Chiaramonti in the Vatican, Meyer found three antiques which he took to show undoubted evidence of adenoids. These are No. 80, the head of a boy of ten to twelve years old, No. 189, that of a boy of three or four years, and No. 192, the bust of a young lady of rank. The first two are probably portraits, the third an ideal bust. Mediæval portraits, too, show similar proof, and Meyer cites as prominent examples the pictures of Antonio Canova, the sculptor (1755-1822), Charles V. and his brother Ferdinand I., and Francis II. Regarding the last named monarch, a very interesting contribution was made in 1893 to medico-historical literature, by Mons. Potiquet, in his book "La Maladie et la Mort de François II, roi de France," relative to his premature death. Potiquet points out that his disease may be regarded not only as the indirect cause of the many sorrows of Mary, Queen of Scots, whose first husband he was, but of much else, including the massacre of St. Bartholomew. Francis was an unwholesome looking boy, with a colourless, pimply face, and marked dulness of intellect. He suffered from nasal obstruction, his breath was offensive, and his mouth always open. The latter fact is not much indicated in his portraits, but, like many other cases of adenoids, he was probably capable of keeping his lips together by an effort, and for a short time. He died of meningitis or cerebral abscess, dependent upon suppuration in his left tympanum, at the age of sixteen. Michelet attributed his trouble to hereditary syphilis, Thou and D'Aubigné to causes connected with Catherine de Medicis, but Potiquet does not consider that there is sufficient evidence to prove that Henri II. and Catherine suffered from the former disease. The king's contemporaries seem to have recognised the connection between his ear trouble and the obstruction in his nose. In the rude pathology of the time they expressed the process as a "formation of corruption in one of his ears, which discharged the function of his nose," or, as Henri II. described it, "the humours of the little king were discharged by a wrong channel, owing to his not being able to blow his nose." It is clear from this that Francis, so far from deserving the contemptuous abuse lavished on him by Michelet and other historians, deserves rather our sympathies as being simply, in the first instance, the subject of aprosexia,* and subsequently falling a victim to the consequences of adenoids, allowed to flourish with unchecked luxuriance.

Another monarch, who has always interested me as a possible subject of adenoids, though probably to a slighter extent than Francis II., is our own King Edward VI. Putting aside any suspicions of a violent end by poison, he is said to have died of pulmonary consumption. More than one of his portraits have seemed to me to indicate adenoids, and the tendency that they impart to serious affections of the air passages is well recognised.

To Meyer undoubtedly belongs the honour of being the true discoverer of adenoids, for he alone of those who observed them properly appreciated their importance. Czermak, in 1860, noted them, Voltolini and Lowenberg described two and three cases respectively, but for some reason failed to grasp their significance. Adenoids, however, just missed being discovered by an Englishman, for (although it is a fact not generally known), the late Mr. William Harvey, who was Senior Surgeon to the Royal Ear Hospital from 1846 to 1876, noted the circumstance that in some cases of deafness in children the scratching of the naso-pharynx with the finger-nail was followed by improvement. He does not appear, however, to have followed up this observation by any investigation or enquiry into the cause of the phenomenon. My late relative, Mr. James Yearsley, distinctly describes cases of adenoids in his published works, a fact noted by Meyer in his original communication.

Meyer's original communication was published in the Medico-Chirurgical Transactions for 1870, and was entitled "On Adenoid Vegetations in the Naso-pharyngeal Cavity: their Pathology, Diagnosis, and Treatment," by Wilhelm Meyer, M.D., Copenhagen. It was communicated by John Marshall, F.R.S. It was received on October 18th, and read on November 23rd, 1869. The paper commences with a reference to a permanent defect of speech—now the well-known "adenoid speech"—common and frequently coincident with a very marked defect of hearing, superficially resembling a chronic cold, with the mouth always open. The author then goes on to describe so accurately the symptomatology of the disease that little, if anything, could be added to it to-day, 32 years after it was written. He relates his discovery, and gives the history of his first case, a case whose name should be handed down to posterity, for it is as historical as Jenner's first success in vaccination. Meyer was consulted by a girl aged twenty, who suffered from deafness, whose voice was most peculiar, and the expression of whose face was almost idiotic. Treatment directed to the ears and throat failed, and it was not until the puzzled observer one day introduced his finger into the post-nasal space that an unexpected solution of the difficulty was found. Instead of penetrating into an open cavity, the finger was arrested by a large, soft, easily bleeding mass, a condition the nature and existence of which in those days was utterly unknown. Meyer succeeded in operating upon this case with marked success, after several fruitless attempts. The deafness was materially improved, the voice became natural, and the idiotic expression of the face disappeared. It was in the way that Meyer turned this gratifying result to account that his merit lies. As Sir Felix Semon said in his speech at the unveiling of the Meyer memorial at Copenhagen, "Schopenhauer has truly said that not he is the finder of a thing who lifts it from the ground and drops it again, but he who, recognising its value, takes it up and keeps it." Meyer did not regard his case as a mere pathological curiosity, but began to study the subject in all its bearings, feeling with true scientific instinct that he held a clue in his hand. He examined the mass that he had removed with regard to its structure, and recognised its origin, for in the paper already referred to he says, "Concerning the vegetations on the posterior and superior pharyngeal walls, there can be no doubt as to their constituting an hypertrophied condition of the *pharyngeal tonsil* of the adjacent mucous membrane lining the roof of the cavity." He investigated the results of naso-pharyngeal obstruction upon hearing, articulation, and facial expression, and their bearing upon general, mental, and bodily development. He summed up thus: "The general rule may be, therefore, laid down, that *a deaf patient, who breathes through the mouth, and has a thin compressed nose, is affected with vegetations in the naso-pharyngeal cavity,* and to confirm this we do not even require to notice the speech."

---

* This term was applied by Guye, of Amsterdam, in 1887, and is derived from two Greek words signifying defective power of fixing the attention.

He entered into statistics, and it is interesting to find his statements borne out by many later observers. Of 102 cases in his practice in eighteen months, he found seventy-two with ear symptoms, and fifty-two with the characteristic pronunciation. He examined 2,000 children of the poor public schools of Copenhagen, the majority from ten to fifteen years of age, and of both sexes. He found twenty cases (1 per cent.) of "dead" pronunciation, all with adenoids. When he had thus discovered the frequency of the condition he began to give his work to the world. No man ever better realised the importance of his discovery, and no man could have done more in spreading it abroad.

Like many other discoveries of importance, that of Meyer did not for a long time make any headway. Even in 1881, when he introduced a discussion on the subject at the International Congress of Medicine held in London, it came almost as a novelty to his assembled hearers, despite the fact that many of them were specialists. But, by sheer weight of evidence, practitioners of medicine, parents, and others who have to deal with the young, have at last become convinced of the practical importance of the discovery, with the result that many cases which, forty years ago, would have been allowed to lapse into hopeless deafness, or fall victims to all the baleful consequences of neglected middle ear suppuration, are quickly recognised and relieved.

Meyer lived to see the results of his labour firmly established on a sure basis; he died in 1895 in the satisfaction of knowing that his discovery had become universally recognised. Three years later, on October 25th, 1898, a monument, executed by Bissen and Runeberg, and subscribed for by physicians, surgeons, specialists, general practitioners, and grateful former patients, from every quarter of the globe, was unveiled at Copenhagen. In the speech at this ceremony, the man thus honoured was described as "One of the greatest benefactors to mankind medicine has ever known." Every country must envy, but none can be jealous of the land that gave Hans Wilhelm Meyer birth.

Before pursuing enquiry into the ætiology, pathology, symptomatology, and treatment of hypertrophy of the pharyngeal tonsil, it will not be amiss to dwell for a few moments on the importance of the disease. This concerns not merely the specialist, but is of equal consequence to the general physician and the general surgeon. There is scarcely any other disease more widespread in its manifestations, more far-reaching in its consequences. In an excellent article on the "Versatility of Adenoid Vegetations," Dr. Francis expressed the belief that "No single affection in the whole domain of medicine and surgery has so far-reaching and general effect on the public health as these innocent little over-growths." This opinion will meet with universal acceptance. It has been computed that at least eighty per cent. of all cases of deafness are due to adenoids, and of these at least half—to put it moderately—are cases of suppuration. Beyond this there is the strong tendency to catarrhal conditions of the upper air passages which they induce, the interference with development, bodily and mental, which they exert, the deformities, especially of the chest, which they take part in producing, the aprosexia, which is so prominent a symptom in a majority of cases. Further, the variety of reflex phenomena which can be traced to their presence, can only be learned by experience. Laryngismus stridulus, asthma, nocturnal enuresis, *petit mal*, are only a few of the most prominent ones. Francis, in the paper just referred to, gives an especially interesting report of four cases of epilepsy in children, entirely and promptly cured by removing adenoids. One of these cases, a boy, had thirty seizures in twenty-four hours, losing consciousness during the attacks, and biting his tongue. The passage of the finger into his naso-pharynx disclosed the adenoids, and at the same time produced the worst fit he had been known to experience. The removal of the growths lessened the attacks immediately, and in three weeks they had ceased permanently. The remaining three cases exhibited severe *petit mal*. No doubt many cases of infantile convulsions could be traced to the same cause.

Thus it is seen that adenoids have to answer for a great variety of symptoms, and may be responsible for many otherwise mysterious manifestations, which might baffle the practitioner who is not upon the alert.

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CHAPTER II.

ÆTIOLOGY.

Adenoids are so universal in their occurrence that the number of ætiological factors with which the investigator is confronted is large. Meyer, in his original communication, says but little concerning the causation of the growths, beyond giving it as his opinion that struma and local irritation are agents of some power in the matter. In his last article, however, he entered at some length into the question of racial liability. Numerous other writers have given attention to various points of importance, and this, coupled with personal experience, enables one to construct a comprehensive and fairly accurate account of the causative factors, according to each its relative value.

As in most maladies, the causes of adenoids may be divided into predisposing and exciting, but, as is also the case in many other diseases, it is not always possible to draw a strict line of demarcation between the two groups. One cannot, therefore, always adhere closely to this classification, but I shall endeavour to do so, so far as it is possible.

The PREDISPOSING CAUSES may be grouped as follows:—

1. Age.
2. Sex.
3. Race.
4. Climate.
5. Heredity.
6. Anatomical Peculiarities.
7. Bad Hygiene.
8. Constitutional Diseases.
    (a) Tubercle.
    (b) Rheumatism.
    (c) Syphilis.
    (d) Diseases tending to catarrh.

The EXCITING CAUSES are:—

1. Catarrhs.
2. Exanthemata.
3. Diphtheria.
4. Pertussis.
5. Septic and other throat affections.
6. Influenza.

I propose to examine into this classification in detail, and to consider the relative importance of each factor.

PREDISPOSING CAUSES.

1. *Age.*—The condition is most common in children under the age of eight years, but it is also frequent between puberty and twenty-four years. Of Meyer's first 102 cases, the youngest was three, the oldest forty-three years, and the details given are worthy of reproduction here:—

3	patients	were	under	5	years
34	„	„	from	5 to 10	years.
25	„	„	„	10 to 15	„
21	„	„	„	15 to 20	„
11	„	„	„	20 to 25	„
1	„	„	„	25 to 30	„
4	„	„	„	30 to 35	„
1	„	„	„	35 to 40	„
2	„	„	„	40 to 45	„

O'Kinealy, in an analysis of one hundred cases in India, found that amongst the Europeans fifty-two and amongst natives twenty-one of the cases were under twenty years of age—a total of 73 per cent. The remaining 27 per cent. were twenty or more. The youngest patient in each race was three and a half years old, the eldest was, among the Europeans, 31, and in the natives 35. The highest and lowest limits were: European males, four and thirty-one years. European females, three and a half and twenty-one years. Native males three and a half and thirty-two years. Native females eight and thirty-five years.

M'Bride and Logan Turner analysed 500 cases. They found the ages of 488 of them to be as follows:—

Age.	Number.	Age.	Number.
0 to 5 years	57	26 to 30 years	24
6 to 10 „	141	31 to 35 „	18
11 to 15 „	115	36 to 40 „	4
16 to 20 „	86	41 to 45 „	1
21 to 25 „	38	46 to 50 „	4
		Total	488

As a result of the figures obtained from their cases these observers concluded that adenoids are most commonly met with between six and fifteen, but that they are fairly common under five years and between fifteen and twenty years.

In my own recently published series of 307 cases, the ages ranged between four months and forty-six years, but the great majority were from three to sixteen years. The youngest operated upon was eleven months, the oldest forty years.

Cuvillier has given an interesting analysis of sixty-four cases of adenoids in the first year of childhood.

Delstanche has mentioned cases of persons thirty-six and forty-two years old as "developing" adenoids, and Janquet stated that he had operated on a woman of forty-five to fifty years with "voluminous adenoid growth."

These remarks suffice to show that:—

The affection is essentially one of childhood, although it may persist to a very much later period of life.

2. *Sex.*—Of Meyer's original 102 cases, fifty-two were males, fifty females. Of O'Kinealy's 100 cases in India, out of sixty-one Europeans, forty-one were males, and twenty females. Amongst thirty-nine natives, there were thirty of the former to nine of the latter.

M'Bride and Turner concluded that sex seems to exercise a very small influence, their figures being 263 males and 237 females.

Of my own 307 cases, the males numbered 156, the females 151.

In Waterhouse's experience, the growths are distinctly more common in boys than in girls, in the proportion of two to one, his statistics being taken from both hospital and private practice.

In the five series of statistics here quoted, it will be seen that in two—O'Kinealy and Waterhouse—the males are considerably in excess of the females, whilst in the remaining three—Meyer, McBride and Turner, and my own—the numbers very nearly approximate to equality. Probably if careful statistics were taken of many hundreds of cases, it would be found that the males were somewhat in excess, although, speaking from my own experience of a very large number of adenoids seen in the practice of others as well as my own, I do not think the difference would be found to be so great as it is put by Waterhouse.

It may, therefore, be taken that:—

Adenoids occur in both sexes, the relative proportion being an excess among males, but probably not more than one and a half to one.

3. *Race.*—Nearly every race on the globe has been reported as subject to adenoids. In his last paper, Meyer gave this subject much attention. He there stated that of sixty Greenland children examined by Dr. Helms, sixteen (26.7 per cent.) only were free from the disease. It is very common among the North American Indians, and, according to Dr. Tidemand of Monte Video, is not infrequent among South Americans of European descent. It is common in Siam, Sumatra, and South-East Africa, but to a less extent than in Northern Europe. According to Calhoun, of Atalanta, adenoids are very rare among negroes. In China, according to Cantlie (as quoted by Meyer) it is fairly common among half-breeds, and also in pure Mongolians. One point to be noted is, that it is especially common among Jews, in whatever country they may be found.

We can, therefore, say in this regard, that probably *no race of man is exempt.*

4. *Climate.*—Although adenoids have been reported from under every sun, and in every clime, it is in those that are moist and humid that they are most frequent. In all statistics of adenoids in large tracts of country it will always be found that their frequency varies in different localities; for instance, Mr. Cantlie has informed me that they vary greatly in North, East, and South China. Garbini stated that in the moist climate of Southern Italy, with an inconstant temperature, he found 5 per cent of his patients to have adenoids, 20 per cent. being in patients under twenty years of age.

It may be said, therefore, that *adenoids are most prevalent in damp, cold countries,* a prevalence which is due to the liability of the pharyngeal tonsil to become hypertrophied by catarrh.

5. *Heredity.*—It is a by no means uncommon experience for the surgeon to have to operate upon two, three, or even four or more in the same family for adenoids. This fact has been referred to by nearly every writer of any consequence upon the subject. A distinction must of necessity be made between *inheritance* and the occurrence in several members of the family. The former question is interesting, but somewhat difficult of study. Crowley made very careful inquiries for the history of symptoms in parents and their generation, but in only 8 per cent. could he obtain any evidence at all. In several of these the aspect of the parent was enough, without asking any questions. In some all the ordinary typical symptoms were present, but they seem to have disappeared in half of them. The difficulties in the way of ascertaining with any certainty the occurrence of adenoids in parents, are chiefly due to the fact that but little notice was taken of the symptoms up to a very short time ago. Further, no doubt, any symptoms were more or less ameliorated by the removal of enlarged tonsils, an operation which was frequently performed. It is not, however, uncommon to find a history among parents of a "weak throat," of snoring, and of special tendency to take cold in earlier years. A family history of phthisis has also been frequently observed.

But, although there is a decided element of doubt as to the occurrence of adenoids in the preceding generations of a patient's family, there can be none whatever regarding the frequency of occurrence in the members of the same family.

Crowley mentions families of two, three, and seven; Waterhouse has operated on two, three, and four members of one family, whilst in my own 307 cases there were no less than fourteen families. Of these, twelve contained two members, one possessed four, and another as many as eight. This last named family was represented by a little girl, aged two years, whose mother informed me that of eight children five had died between the ages of one and two and a half years of "inflammation of the brain," following a discharge from the ear, the remaining two succumbing to bronchitis. The sole survivor was the subject of a very large pad of growth, which was removed, with the result that the ear (discharging) became rapidly well.

Of M'Bride and Turner's 500 cases it was found that there were thirty patients who had either one or more brother or sister affected similarly; in nine instances there were two only, and in four there were three members of the same family affected.

Arslau, of Padua, has given heredity as one of the most important primary causes of the affection, but I do not consider that the evidence of heredity, as meaning *inheritance*, is sufficiently established. It is true that certain transmitted diseases, such as syphilis, or tubercle, may predispose to the occurrence of adenoids, and may, at times, account for their appearance in families, but that they are transmitted from parent to child, though probable, as yet remains unproved. Therefore, it may be said upon this point, that:—

Although it cannot be positively said to be hereditary, hypertrophy of the pharyngeal tonsil often shows a distinct tendency to run in families, or, more correctly speaking, to affect several members of the same family.

6. *Anatomical Peculiarities.*—Some writers have accorded considerable prominence to the existence of certain anatomical peculiarities as being predisposing to the occurrence of adenoids. Parker, for instance, gives the following long list:—

Septal deviations.
Enlarged inferior turbinals.
High and narrow arch to the palate.
V-shaped palate.
Cleft palate.
Small anterior nares.
Contracted nasal fossæ.

I am strongly of opinion that in putting forward the above nasal abnormalities, writers have, in the case of most of them, confused cause with effect. Cleft palate, and, possibly, the other palatal deformities mentioned may be excepted. I feel sure that in a very large number of cases the presence of deviated septum, enlarged inferior turbinals, small anterior nares, and contracted nasal fossæ, is rather due to the adenoids than that the adenoids are due to them.

Adenoids, as has just been said, are essentially a disease of childhood, and they are, consequently, present before the nose proper has become fully developed. Mayo Collier, speaking from an experience of 1,050 patients, indiscriminately examined by him in a large out-patient clinic, found only 110 normal noses. The ages of his cases varied from one to eighty years. He states, from these data, that it is extremely rare to find any nasal obstruction, unless due to temporary causes, below the age of ten years. Further, that in young persons before puberty, one may expect to find a majority of normal septa. I think that the views thus expressed by Collier will meet with the acquiescence of every experienced rhinologist.

Before puberty, the nasal chambers are not fully developed. The bony septum, formed of the perpendicular plate of the ethmoid and the vomer, is not fully ossified until puberty, the centre for the ethmoid plate only making its appearance in the first year. When adenoids are present they may produce a posterior obstruction, which prohibits the nasal chambers from carrying out their proper function, and this abeyance of natural function, together with the want of proper blood supply, which is so often the outcome of hypertrophy of the pharyngeal tonsil, may prevent the perfect progress of the process of development, and so result in narrowness of the nasal chambers and small anterior nares. Further, one of the most prominent symptoms of adenoids is the marked tendency that they engender to the frequent catching of colds. The repeated occurrence of nasal catarrh is one of the most potent causes of chronic nasal obstruction, from enlarged turbinals, spurs, etc. Chronic obstruction, affecting one nostril more than the other (a by no means uncommon condition), will sooner or later result in a septal deviation. Just as the constant dropping of water wears away the stone, so does a constant pressure make the strongest living cavity to give way.

Just as nasal obstruction is brought about by colds, so are colds brought about by nasal obstruction, and, as will be seen later, the occurrence of catarrhal diseases are very potent causes of adenoids. It is quite possible, therefore, that nasal deformities due to traumatism, or, very rarely, to congenital causes, may conduce to the occurrence of adenoids by the predisposition they give to catching colds. Deviations of the septum in young children are decidedly rare, and when they do occur are due to injury, except the dislocation of the septum from the columella. Deviation of the septum in adult life is common, and is due to injury, or to chronic nasal obstruction.

The case of cleft palate is different. It is far from uncommon to find cleft palate associated with adenoids and enlarged inferior turbinals, and this may be attributed to the irritation of the air passing directly into the naso-pharynx through the mouth, and possibly also to the irritation of the direct contact of food.

I do not wish to say that the above mentioned anatomical peculiarities may not occasionally predispose to adenoids; in the exceptions that I have mentioned they may do so, but I would insist that in the great majority of cases the septal deviations, enlarged inferior turbinals, small anterior nares, and contracted nasal fossæ are *effects*, and not causes of pharyngeal tonsillar hypertrophy.

The association of adenoids with palatal deformities needs some attention by itself. It was long held that the high vaulted and V-shaped palate were usually, if not always, the result of post-nasal obstruction. I believe this to be an error, for the way in which it occurs has never been explained to my satisfaction. That it should result from rarefaction of the air in the pharynx is absurd, for any such rarefaction would take place below the adenoid mass. Then it has been said that the open mouth, with the dragging lower jaw, approximates the alveolar arches by pulling them down and in. No doubt this may appear very ingenious at first sight, but I know of no facts, either anatomical or clinical, which would give the least support to such a theory. I am pleased to find that in this opinion such an authority as Jonathan Wright, of New York, is in agreement with me. The following remarks upon the subject from that author's pen are of sufficient importance to quote them here:—

"Some years ago, E. Fraenkel (Inaug. Dissert., Basel, 1896), by careful measurements, came to the conclusion that this configuration of the jaw occurs no more frequently in those who have than in those who have not had post-nasal hypertrophy. The paper of Grossheintz ("Archiv. für Laryngologie," Bd. 8, Heft 3) fully supports this view. Indeed, Lange had stated, and it has been my experience that cases of a very high, narrow palatal arch are not infrequently seen without a trace of 'adenoids.' According to Grossheintz, the existence of this condition depends upon the type of the skull; whether, in other words, it is dolicho-cephalic or brachio-cephalic. The deductions which he makes from his exhaustive and somewhat exhausting observations are as follows:—

1. With a high, narrow, alveolar arch (hypsistaphylia) is usually associated a general narrowing of the upper face (leptoprosopia).

2. Narrow nasal passages (leptorrhinia) and narrow orbits belong to the skull formation, having high arched palates.

3. Hypsistaphylia depends, as a rule, upon the congenital racial characteristics of the skull, and not upon the later extra-uterine influences of nasal stenosis."

Lastly, it is of importance to quote Wright's opinion on the influence of palatal peculiarities as a cause of adenoids:—

"While it seems very evident to me that 'adenoids,' as the cause of narrow jaws, have been a subject in which very erroneous views have prevailed, I am not convinced that the narrow jaw, on the other hand, does not have some ætiological influence upon the occurrence of lymphoid hypertrophy in the vault of the pharynx. We may presume, at least, that 'adenoids,' occurring in such subjects, are very much more apt to produce symptoms, especially of obstruction, and thus more frequently come under the observation of the physician than do those of the brachio-cephalic type; but even this assumption should not be too absolutely entertained in the face of the extensive measurements and careful observations of Fraenkel and Grossheintz."

It will thus be seen that the influence of anatomical peculiarities is *doubtful*.

7. *Bad Hygiene.*—The bad hygienic surroundings, and especially the bad feeding to which the children of the poor in large cities are subjected, are not unimportant. By rendering the organism less resistant to the attacks of catarrhal diseases and to the exanthemata, they have a powerful influence as predisposing factors. The reverse condition of coddling and over feeding amongst the upper classes may have a similar influence.

8. *Constitutional Diseases.*—Certain constitutional diseases and conditions have considerable effect as predisposing causes of adenoids. Of these the most important are tubercle, rheumatism and gout, syphilis, cretinism, and the diseases which tend to catarrhal inflammations.

(*a*) *Tubercle.*—The occurrence of tubercle in the family history of patients suffering with adenoids is very common. The condition, which used to be termed "scrofula," is alluded to by Meyer in his original paper as one of the commonest ætiological factors. It is a good thing that this vague term has become almost an obsolete one. Bosworth applied the apter name of "lymphatism" to the condition of a large class of sickly, ailing children, who are prone to develop enlarged tonsils and lymphatic glands, and in whom adenoids are so frequently found. It must not be forgotten, however, that the general enfeeblement met with in such cases and adenoids is much more frequently the interchangeable phenomena of cause and effect. Adenoids undoubtedly predispose to tubercle, a matter which will be discussed at length when dealing with the pathology of the disease. At the same time, the diathesis, which has been variously styled "strumous," "scrofulous," or "tubercular," predisposing, as it undoubtedly does, to the chronic inflammatory enlargement of the different masses of lymphoid tissue distributed in the body, cannot but contribute to the development of hypertrophy of the pharyngeal tonsil. It must not be forgotten that this tonsil is but a part of the ring of lymphoid tissue placed at the entrance of the food and air passages, and as such is a part of the general lymphatic system, and will partake of the results of diseases which tend to affect that system. It has been asserted that struma is the cause of adenoids, *par excellence*, but while it is undoubtedly true that they are very frequently observed in such cases, they are as frequent in the healthy and vigorous.

The connection with Phthisis in the family history is fairly frequent, in so far as statistics—often misleading—are of any value on this point. Crowley obtained such a history in no less than 40 per cent. of his cases (350).

(*b*) *Gout and Rheumatism.*—An hereditary tendency to these diseases forms a distinctly appreciable feature of many of the family histories of adenoid cases. They act by the influence that they have in inducing catarrhal conditions.

(*c*) *Syphilis.*—Syphilis is a disease which is prone to affect the mucous membrane of the upper air passages, especially when hereditary. The lymphatic glands in hereditary syphilis are less often involved than in the acquired disease. There may be enlargement of some or all the glands in cases affected with chronic snuffles only, or in those with craniotabes in addition. The bearing of the congenital variety of the disease is, however, most important in the ætiology of adenoids, from the frequency with which it induces coryza. According to Carpenter, coryza is the earliest and most frequent manifestation of hereditary syphilis. It is rarely absent, and not infrequently is the only sign. It persists for months or years, and in that writer's experience is often followed by adenoids. On the other hand, there may be chronic rhinitis without a trace of post-nasal adenoid hypertrophy. My experience is in complete accord with that of Carpenter, and I have frequently noted that adenoids occur in children the subjects of congenital syphilis.

(*d*) *Cretinism.*—Whether the occurrence of adenoids in cretinous patients is independent or interdependent is an undecided point. That there is a connection between cretinism and tubercle, tubercle and adenoids, is known to us, although as yet imperfectly. The difficulty of deciding this connection of adenoids and cretinism is shown in a case of deaf-mutism recently published by me. De Simoni has endeavoured, with theoretic reasonings, to connect adenoidism and thyroidism. He regards adenoidism and myxœdema as belonging to the same disease, from an analogy of the clinical symptoms of those possessing adenoids and of the weak minded myxomatous, the presence of adenoids in the latter, and the great frequency of adenoids where cretinism is endemic. I am not altogether disposed to agree with De Simoni's arguments. The presence of adenoids in the myxomatous is quite as likely to be due to the general debility of such patients, and their occurrence in localities where cretinism is endemic may equally be due to the climatic and other conditions prevailing.

(*e*) *Diseases tending to catarrh.*—As will be seen later, when dealing with the exciting causes of adenoids, catarrhal conditions of the upper air passages are amongst the most important factors. Any diseases, therefore, that tend to induce such condition have equal importance as predisposing causes. It is here that is found one of the main difficulties in drawing any absolute line of demarcation between the predisposing and exciting causes. As has been said, tubercle, gout, rheumatism, and syphilis, all act in this way, and, therefore, any other malady, constitutional condition, or dyscrasia (such, for instance, as Rickets), unhealthy environment or method of life will all have a similar influence. Some patients appear to possess what may almost be termed a "catarrhal diathesis."

EXCITING CAUSES.

1. *Catarrhal Inflammation* of the upper air passages is probably the most frequent exciting cause of hypertrophy of the pharyngeal tonsil. In the 307 cases analysed by me, by far the greater number gave "colds" as responsible for the condition, the number being sixty-four—thirty males and thirty-four females. In this connection it must be repeated that the pharyngeal tonsil is part of the general lymphatic system, that lymphoid tissue occurring in the naso-pharynx is no more abnormal than are the tonsils or the maxillary glands; it becomes pathological only when it is enlarged—enlarged enough, that is to say, to produce symptoms. The steps that lead to the production of this enlargement are quite simple. It is not possible to imagine a child suffering from catarrhal inflammation without some swelling, more or less, of this lymphoid tissue, but in a healthy and well-nourished child the condition soon passes off, leaving no untoward results behind it. In a badly nourished, unhealthy, or delicate child, however, the result of a catarrh is very different; the inflammation is protracted and tends to become chronic, mucus collects in the nasal passages, micro-organisms are active, and the swelling of the adenoid tissue is not only increased, but, even when the "cold" is eventually recovered from, it never completely subsides. The result is the formation of a vicious circle, the individual is prone to take cold much more easily, and eventually the swelling of the lymphoid tissue becomes of sufficient size to become pathological, and to cause the characteristic symptoms of obstruction. It may be further remarked here that it is in this way that bad hygiene and bad feeding act in so many cases as potent predisposing factors.

Attacks of bronchitis, too, will favour the occurrence of adenoids, but in many cases it is the latter that predispose to the former by the influence they exert in preventing normal respiration.

2. *The Exanthemata.*—Any disease of childhood that produces nasal catarrh and pent up secretion will bring about the formation of adenoids. It is thus that the exanthematous fevers act. After "colds," these fevers were the most prominent causes given in my 307 cases. Twenty-six (twelve males, fourteen females) gave scarlet fever, and the same number and proportion of sexes gave measles as the cause. Crowley found that measles caused 40 per cent. of his cases. It must not be forgotten, however, that these diseases may have merely

caused an increase in the bulk of the growth, and thus have directed attention to them; that is to say, the adenoids were antecedent to the fever. This is the opinion expressed by M'Bride and Turner, whose experience agrees with that of the numerous other observers who have traced the occurrence of adenoid symptoms to some antecedent acute illness. The fact that adenoid symptoms may be first noted after a severe illness does not indicate that the growths have not to some degree existed before.

What has already been said regarding the way in which catarrhs act in inducing enlargement of the pharyngeal tonsil applies to the exanthemata. Mumps, varicella, and influenza also appeared as causes in my cases, but the preponderance of measles and scarlet fever is probably due to the severe inflammatory conditions of the nose, naso-pharynx, and fauces that they induce.

3. *Diphtheria.*—It is to be expected that a disease which attacks the throat with such violence as does diphtheria, would be a fruitful cause of adenoids. It does not, however, account for more than a small percentage of cases. In my analysed cases those giving diphtheria as responsible were only 2 per cent.

4. *Various Throat Affections.*—In a certain number of cases the symptoms are described as having begun with "sore throats"; this is probably merely that the catarrhal condition really responsible is frequently accompanied by faucial inflammation. At the same time, the repetition of acute attacks of tonsilitis is probably always accompanied in some instances with a similar affection of the pharyngeal tonsil, either simultaneous or later by continuity.

Whilst speaking upon this subject, it will be well to mention that O'Toole has suggested gonorrhœal infection of the mother at the time of birth as a possible cause for adenoids. What led him to suggest this was a case which came under his observation. In this instance, in a family of four, there were three children, is more common in adults; in the former, one is more A gonorrhœal discharge existed in the mother when the three adenoid children were born, but was cured when the fourth and normal one came into the world.

Any septic condition of the throat, nose, or naso-pharynx may be responsible for a pathological increase in size of the pharyngeal tonsil.

5. *Pertussis.*—Whooping cough is given as a cause in about 2 per cent. of cases.

To sum up the exciting causes, it may be said that:—*The predominant causes are catarrhal inflammations and those of the exanthemata in which the upper air passages suffer most.*

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CHAPTER III.

ANATOMY AND PATHOLOGY.

Before considering the pathology of hypertrophy of the pharyngeal tonsil it is necessary to become acquainted with its normal anatomy, and to consider its structure, both macroscopic and microscopic.

The pharyngeal tonsil was first described and illustrated by Schneider in 1665, in his work "*De Catarrhis.*" He was followed in 1732 by Winslow, and in 1775 by Santorini, who was the first to compare it with the tonsil. In 1846 Tortual drew attention to the ridges and furrows in the lining coat of the vault of the pharynx, and Lacancher recognised their glandular nature as early as 1753. Kollike confirmed these observations in 1863, and gave the thickness of the glandular layer as 9 mm., at the same time declaring its structure to be identical with that of the faucial tonsil.

The pharyngeal tonsil is an organ normal in the human subject. It is of fœtal origin, and its development is probably contemporaneous with that of the lingual tonsil, although Bickel says that the latter appears earlier. As regards the faucial tonsils its development is concomitant. It occupies the roof of the pharyngeal cavity, from the choanæ to the anterior border of the body of the occipital bone, extending from one fossa of Rosenmüller to the other.

Prolongations extend into the fossæ of Rosenmüller, and, according to most authorities, on to and even into the Eustachian tubes. The former is denied by some observers; Richardson, of Washington, for instance, who states that he has never met with enalrgement of the pharyngeal tonsil in Rosenmüller's fossæ. I have, however, found it there not rarely, and have been more than once able to distinguish it in that position by means of the posterior rhinoscope. Those of my colleagues with whom I have spoken on the subject agree with me thereon, and I would refer the reader to an excellent paper on this matter by Lockhart Gibson. This paper is based on the writer's clinical experience, which is always the most reliable evidence to go upon. I myself have noted that in most cases where the hypertrophy is present in Rosenmüller's fossæ the concomitant deafness has been out of all proportion to the size of the main mass of growth. Lindo Fergusson of Dunedin also supports this opinion.

Trautmann divides the pharyngeal tonsil into an anterior and a posterior part. The former is divided into six antero-posterior furrows, the latter, running towards Rosenmüller's fossæ, is also cleft, but the furrows run forwards and outwards. Of the various furrows the median cleft is always the most marked and constant.

The pharyngeal tonsil is subject to very considerable microscopic variations, and consists of a mucous membrane ¾ cm. thick, divided by vertical furrows varying considerably in number, depth, and course. As a rule, there is one deep median furrow and two shallow lateral grooves dividing the gland into six ridges running parallel, slightly converging at their posterior ends. These longitudinal furrows are interrupted by transverse ridges. The ridges are yellowish red in colour, and are nearly always covered by thick mucus. The removal of this mucus uncovers at the crest of the ridges the punctate elevations of the mouths of the follicles, giving the surface a somewhat granular appearance.

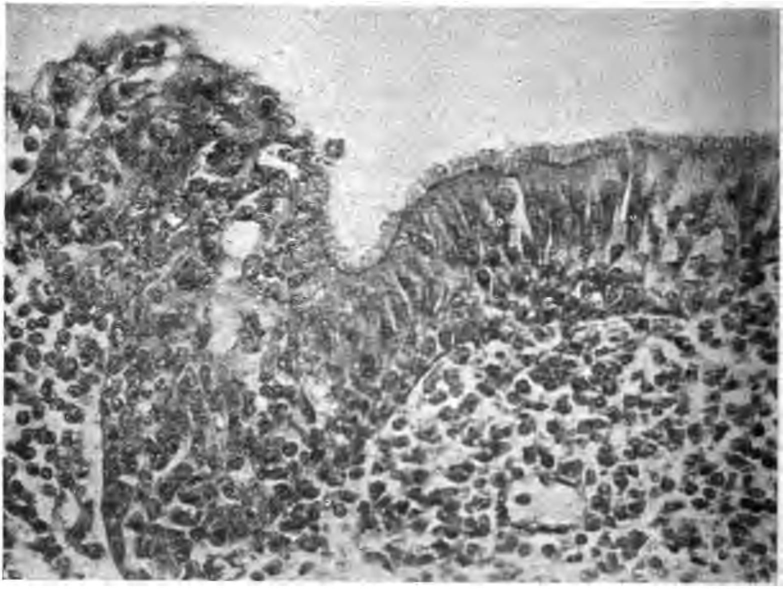

FIG. 1. Microscopic section of the normal pharyngeal tonsil, showing the epithelium (x 360 diameter).

In the newly born child the median furrow is very distinct, the secondary shallow furrows showing as mere striæ. Owing to the frequency with which the pharyngeal tonsil is hypertrophied, to a greater or less degree, its normal condition is best studied in the fœtus at term, as it is practically only then that one can be sure of finding the gland in its normal anatomical condition. If thus examined microscopically, a cross section shows its structure to be as follows.

Each ridge shows a structure to be divisible into three layers:—

1. Epithelium with basement membrane.
2. Propria.
3. Submucosa.

These must be considered in detail.

1. *Epithelium.*—The epithelial layer (Fig. 1.) is about 0.11 mm. thick, and is of the ciliated columnar type. The uppermost row consists of cells ciliated on their free border, conical below, slightly granular, and containing intensely stained nuclei in their lower thirds. This row is supported by about six layers of cubic or ovoid cells, the uppermost row of which sends long spindle-like processes between the lower parts of the columnar cells. A continuous row of cubic cells, with well-stained nuclei, form a definite base, and these three layers of cells rest upon a fine structureless basement membrane.

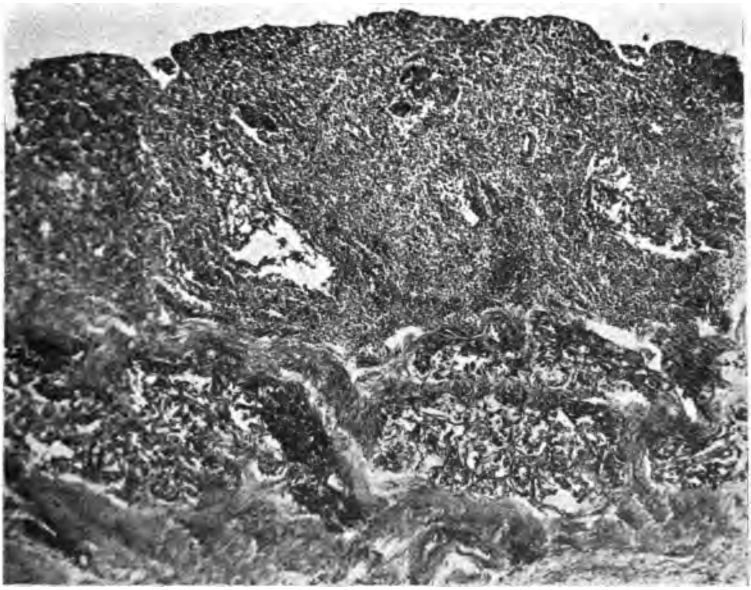

FIG. 2. The pharyngeal tonsil in the fœtus at term. The surface has been denuded of epithelium, and the section shows the lymphoid and sublymphoid layers, with mucous glands in the latter (x 60 diam.).

2. *Propria.*—The proper structure of the tonsil is some ten to twenty times as thick as the epithelial layer, to which it runs parallel. It consists of a framework formed of a network of very fine connective tissue fibres, supporting faintly stained spindle cells at their intersections. This reticulum contains blood vessels, lymphatics, and capillaries. Within this meshwork, and completely hiding it, are numerous small round cells

with well-stained nuclei, and but little protoplasm. These are most abundant around the blood-vessels, where they indicate a tendency to follicle formation. In the new-born infant the round cells in the propria are pure leucocytes, with molecular contents. There are no acidophile or mast cells or hyaline globules to be observed. This layer and the next are shown in Fig. 2.

3. *Submucosa.*—A wide stratum of scantily nucleated fibrous tissue running in undulating bands parallel to the surface, and containing blood-vessels and lymphatics, forms the submucous tissue beneath the epithelial and propria layers. The bulk of the mucous glands are at the base of this layer. Their bodies are made up of ramified and convoluted tubes lined with nucleated columnar epithelium. The juxtaposition of two ridges creates a slit-like depression for the reception of the glandular secretion. Beneath the submucous layer is the basilar fibro-cartilage.

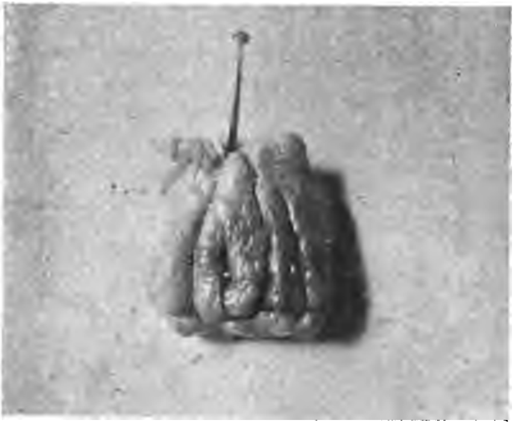

FIG. 3. Adenoid growth from a girl aged 13 years, showing the ridges and furrows (1-5th enlarged).

The above description gives a sufficiently clear idea of the histological structure of the normal pharyngeal tonsil, as shown by the microphotographs (Figs. 1 and 2), made from a preparation of my own.

The physiology of the tonsils and the lymphoid tissue in the faucial and pharyngeal regions has been investigated by Lovell, Gulland, Stöhr, Hodenpyl, and many others, but one cannot say that their function is yet perfectly understood. The situation of the ring of lymphoid tissue at the entrance of the food and air passages suggests that the four tonsils—faucial, pharyngeal, and lingual—fill the rôle of a "guardian of the portal." Some knowledge of their proper function is most important from the point of view of infection by micro-organisms, and it is to be hoped that future investigations will throw further light on the matter. The rôle assigned to the leucocytes in lymphoid tissue is a two-fold one; on the one hand, many of them pass into the lymph stream and thence into the blood; on the other hand, many pass out through the epithelial covering of the tonsils on to the free surface of the gland, there to be caught in the mucus, and assist in destroying the micro-organisms lying in contact with the surface. There is apparently a deficiency of this emigrating power when the pharyngeal tonsil is hypertrophied, especially where the epithelium is, as will be described, thickened and altered to the stratified squamous variety. This deficient emigration, together with the alteration of the epithelium and the destruction of its cilia, must constitute a source of danger to the patient by diminishing his resisting power to the attacks of micro-organisms from without.

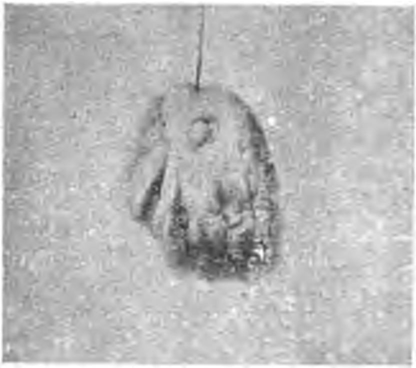

FIG. 4. Adenoid growth from a boy, aged 11 years, showing a small cyst near the centre (nat. size).

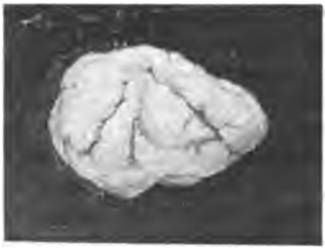

FIG. 5. Adenoid growth from a girl aged 17, showing the shrinking from predominance of the fibrous tissue element.

I now pass on to consider the alterations brought about by hypertrophy, taking first the naked eye appearances. It will be patent to all who have had much experience of these growths and their removal *en masse*, that the representations which have been so frequently given in the text books are grossly inaccurate, and utterly unlike the true appearance of adenoids. They are—or were—usually represented and described as like "a bunch of grapes." Until recently, no attempt has been made to show photographic pictures of adenoids removed by operation, or to accurately depict their form. The aspect of a mass of hypertrophied pharyngeal tonsil is merely that of an exaggeration of the ridges and furrows found in the normal gland. Figs. 3, 4, 5, and 6 show this point perfectly, photographed as they are from masses removed by myself with Delstanche's cradelled curette.

Adenoids may be clearly distinguishable into two groups, the hard or fibrous type, and the soft or gelatinous type. This difference depends less upon the age of the patient than on the character of the histological elements of the growth. The soft adenoids are often found in the adult, and the fibrous in children, and this is by no means incompatible with the fact that changes take place in young adult life, attended with increase of density of the connective tissue element and attendant atrophy of the lymphoid elements.

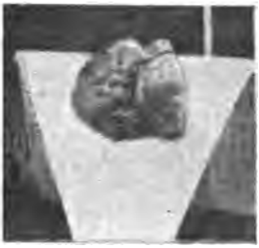

FIG. 6. Adenoid growth showing obliteration ot the secondary sulci and persistence of the median cleft.

Macroscopically, the ridges and furrows of the gland can be always traced. They vary in different specimens, but their direction is the same in every case, namely antero-posterior. This is well shown in the figures. As a rule, the furrows are deep, separating the ridges distinctly, often so that the growth comes to pieces on examination like a broken fan. When the ridges are, as it were, fused together, as by repeated attacks of catarrhal inflammation, the median furrow is always easily discernible. This median cleft is, in hypertrophied pharyngeal tonsils, called the "recessus medius," and its presence has an important bearing upon the occurrence of naso-pharyngeal catarrh and cyst formations. Schäffer states that it may become partially converted into a canal by the union of its boundary ridges, and the obvious result of such union would be the complete or partial retention of exudation. Cysts, containing glairy, mucoid material, and hæmorrhages are frequently found, and sometimes cheesy accumulations of dead epithelium and inspissated mucus are seen in the furrows, often offensive in odour. A small mucoid cyst is seen near the centre of Fig. 4. The cysts are due to the cause just mentioned, or to distension of a crypt whose orifice has become closed, and the pressure exercised by this distension leads to a loss of cilia and a thinning of the epithelium. All stages of this process may be visible in a crypt. Fig. 3 shows well the ridges and furrows in the soft variety of growth, whilst Fig. 6 indicates the persistence of the median cleft when the other furrows have become obliterated. Fig. 5 is an instance of a growth in which the fibrous element predominates, with atrophy of the lymphoid part and general shrinking. A microscopic section of the last growth is shown in Fig. 8.

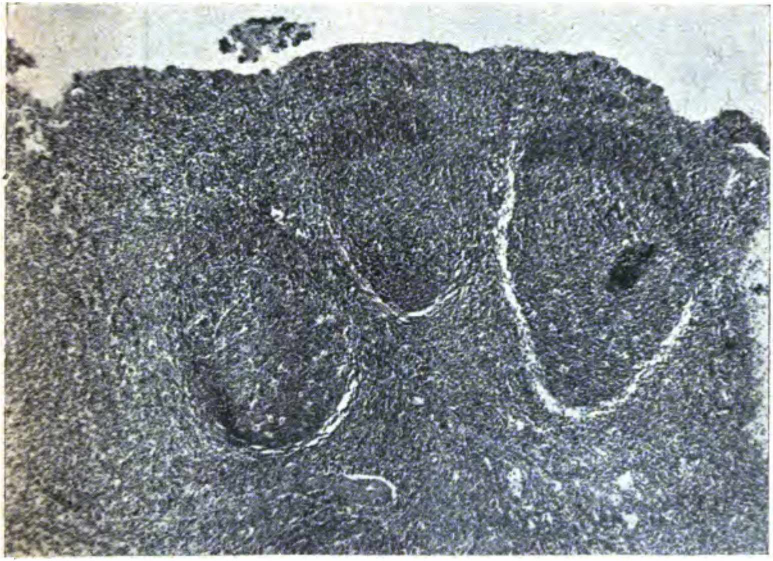

FIG. 7. Microscopic section of the soft (lymphoid) variety of adenoid (x 60 diameters).

The most frequent situation of adenoids is in the vault of the naso-pharynx immediately behind the fornix, at the dome of the pharynx and on the posterior wall. More rarely they extend along the lateral walls and in Rosenmüller's fossæ, a condition to which I have already referred. They are markedly influenced by local inflammation in the nasal and pharyngeal chambers, as well as by disturbances in the alimentary canal.

Their complication with other abnormalities of the upper air passages, and their relation to tuberculosis will be discussed later.

Just as two distinct macroscopical types of adenoid growth may be clearly distinguished, so, as would naturally be expected, are there two distinct forms microscopically. These two types are:—

1. Those marked by an increase in the number of follicles.
2. Those marked by an increase of the inter-follicular tissue.

These are, in most cases, easily distinguishable, but in some they merge into one another. Microphotographs of both types are shown in Figs. 7 and 8.

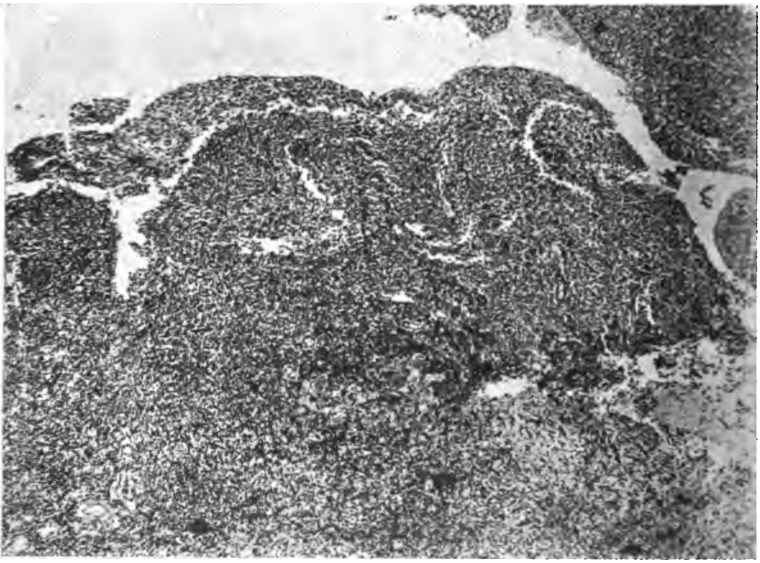

FIG. 8. Microscopic section of the fibrous variety of adenoid (x 60 diameters)

1. *Lymphoid Type* (Fig. 7).—Histologically, this type shows no special peculiarities. Large masses of small round cells form the predominant feature. These confirm in every way to the description given of the normal cells found in the propria No epitheloid or giant cells are to be seen.

2. *Fibrous Type* (Fig. 8).—In this form the increase in the interfollicular fibrous tissue forms the chief feature. The masses of lymphoid tissue are smaller and appear often to be enclosed in definite fibrous areas.

In both types hæmorrhages are sometimes observed, but, as would be expected, more often in the soft, lymphoid type. Yellow pigment, evidently altered blood pigment, occurs between the cells and in the protoplasm of the leucocytes.

The epithelium covering the mass is either stratified columnar, frequently well ciliated, or stratified squamous in type. Often the one is found to merge into the other. Amongst the cells of the former variety are to be found goblet cells.

A variation of the normal epithelial covering is to be expected in a growth subject to pressure and to variations of size. The epithelium is not always uniform in thickness. Usually it preserves its ciliated columnar type, but often it is found distinctly altered, becoming stratified squamous in form, and of considerable thickness. This change is not general, but confined to certain areas. As this alteration is found in young subjects, it is evidently not due to prolonged hypertrophy. It is rather dependent upon pressure on the growth by the walls of the narrow naso-pharynx of the child. A point which favours this view is that it is more frequent on the surface and over cysts than in the crypts. The opposite condition is also found, the epithelium may become thinned, even to a single layer of cells devoid of cilia, or destroyed entirely, a condition mostly found on exposed parts. Sometimes, too, it is evident that the cilia have been destroyed in the crypts by their adjacent surfaces being closely opposed.

Columnar and squamous epithelial cysts are often seen, the former being the more common. They contain a clear, ropy mucus, frequently very rich in leucocytes. The cysts of the squamous type contain a brownish-yellow, jelly-like contents, sometimes giving place to horny lammellæ of concentric arrangement.

From the microscopical examination of a number of adenoids, M'Bride and Logan Turner drew up the following conclusions:—

1. The cilated epithelium may be converted into the stratified variety, and the latter become much thickened, as the result of the intermittent pressure to which the hypertrophy is subjected.

2. This change tends to occur in the smaller naso-pharynx of the young child.

3. The cilia may be destroyed over large areas, and the epithelium thinned to a varying degree; and, further, emigration of leucocytes is not general.

4. There is a tendency to an overgrowth of fibrous tissue, which commences in and around the blood-vessels, and, gradually invading the lymphoid tissue, leads to shrinking of the growth.

5. This process is not confined to the period at or after puberty, but also occurs in very young children, and is, therefore, independent of the age of the patient.

The question of the shrinking of adenoids which has been said to occur at or after puberty is an interesting one. I have more than once pointed out elsewhere that this is often a mistaken idea. The naso-pharynx enlarges at or about puberty out of all proportion to the adenoid mass, and what may appear to be a lessening of the growth is due really to the increase in the naso-pharyngeal capacity. I find that M'Bride and Turner coincide with me in this opinion. They draw attention to the fact (also emphasized by Brindel) that the process of development of fibrous tissue, commencing round the blood-vessels, invading the lymphoid tissue, and replacing it, is independent of the age of the patient, and is not one that necessarily commences at or about puberty, but may occur at all ages, and be even more marked in the very young child than in the adult. The practical deduction to be drawn from this fact is that we cannot say in any given case that a growth may be satisfactorily left to disappear *per se*, a deduction which is of great importance from the point of view of treatment. Such growths do, in some cases, disappear at puberty, but it is quite possible that here a purely physical, as opposed to a purely histological, explanation may be the true condition of things. In the small naso-pharynx of a child the growth may entirely fill the space, while in the adult a free space will be left between the growth and the palate. In the former case, each respiration will exercise suction on the mass, while in the latter this physical effect will be diminished or absent.

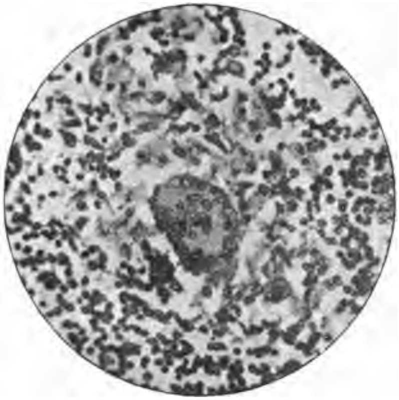

FIG. 9. Section of tuberculous adenoid, showing giant cell and endothelioid cells. Child aged 6 years. (M'Bride and Turner.)

The question of the relation of adenoids to tuberculosis is a most important one, and merits our close attention. The clinical symptoms in no way differ from those of simple enlargement, a reason for the supposition of latent tuberculosis.

On histological examination, however, instead of adenoid tissue rich in follicles, small round areas are observed in varying number, distinguishable by the faintness of the stain. These areas become confluent, and form broad lines of ill-stained tissue separated by narrow lines of well-stained adenoid tissue. The difference of colour is almost always visible to the naked eye. The periphery of these areas is formed of pale, elongated, so-called epitheloid cells; their centre of clear hyaline, partly granular, cheesy masses. Typical giant cells of Langhaus are found among the epitheloid cells, containing sixty or more nuclei (Fig. 9). A light, halo-like mantle surrounds the nuclear ring, and sends finely divided processes into the surrounding tissue. These undoubted evidences of tuberculosis were confirmed in three cases out of four in specimens examined by Hynitzsch. That writer concluded that tuberculosis of the pharyngeal tonsil is a very rare condition, and that it has no relation to the common simple enlargement.

Rethi has observed 160 cases of primary latent tuberculosis of the pharyngeal tonsil, where the body presented no other evidence of tuberculosis, and the pharyngeal tonsil appeared not to be infected. His patients were usually from seven to seventeen years of age. In seventy-six there was hereditary dyscrasia present, and in fifty-eight the glands were affected. Fourteen had the "scrofulous habit," and in two-thirds the faucial tonsils were enlarged. The pharyngeal tonsil was generally enlarged, and interfered with respiration in two-thirds of the cases. The most frequent defect was a soft, tongue-like hypertrophy with a glandular surface. In the histological examination Rethi found tubercles six times, caseation twice. The presence of tubercle bacilli in the epithelium was remarkable. He considers that the infection of the pharyngeal tonsil takes place from tuberculous sputum, by the blood or lymph circulation, or by the inspired air. Enlargement of the gland increases the disposition to tuberculosis, another reason for the removal of every enlarged pharyngeal tonsil.

Lewin examined 200 subjects, among which were many where no hypertrophic process was present. He divided his investigation into two groups: 1. Those in which endeavour was made by every known scientific means to ascertain how often a hyperplasia of the pharyngeal tonsil is the seat of latent tuberculous processes. 2. Those in which the pharyngeal tonsil was removed, *post-mortem*, from tuberculous subjects. Out of his 200 cases ten were found to conceal tuberculous tissue. Lewin's final conclusions were as follows:—

1. Hyperplastic pharyngeal tonsils conceal tuberculous tissue in about 5 per cent of cases.

2. The tuberculosis is present in the so-called tumour form; it is characterised by the absence of surface indications of its presence—latent tuberculosis of the tonsils.

3. This latent tuberculosis may apparently be the first, and, indeed, the only localization of the disease in the individual.

4. It is generally, however, associated with other tuberculous

processes, generally of the lungs, which may, however, not have developed at the time the tonsil was operated upon.

5. It is a comparatively frequent condition among those suffering from tuberculosis of the lungs.

6. It is found in the normal sized tonsil as well as in the hyperplastic. Whether it may cause hyperplasia by the develop of some toxin is doubtful. It can, however, retard the normal involution of the tonsil.

7. Its part in the ætiology of hypertrophy of the pharyngeal tonsil is unimportant.

8. By removal of the tonsil the disease may be removed, even though pulmonary tuberculosis be present.

Luzzatti examined histologically fifty cases. He found simple hypertrophy in all, with no sclerotic areas, but numerous hæmorrhages and cysts. There were tuberculous changes in two, one of which caused tuberculosis in a guinea pig.

It will be seen by the following results of the investigations of various observers that the average relation of tuberculosis to adenoids is 5 per cent.:—

Pluder and Fischer ...	32	cases with	5	tuberculous.
Gottstein ...	33	„	4	„
Luzzatti ...	50	„	2	„
Lermoyez ...	52	„	2	„
Brindel ...	64	„	8	„
Brieger ...	78	„	5	„
Broca ...	100	„	0	„
Hynitsch ...	180	„	7	„
Lewin ...	200	„	10	„
Wex ...	210	„	7	„
	999		50	

To these must be added the work of M'Bride and Turner, and that of Pilliet and Dieulafoy.

M'Bride and Turner, with the object of investigating the possibility of tuberculous infection through the pharyngeal tonsil, examined the specimens removed from a hundred patients, with the result that they found such evidence in 3 per cent. Their first two were private patients, their third a hospital case. In the latter tubercle bacilli were found.

Pilliet histologically examined forty cases of adenoids, and found giant cell systems and caseous degeneration in three of them—7.5 per cent. He did not succeed in demonstrating the presence of tubercle bacilli.

Dieulafoy inoculated guinea pigs with portions of the adenoids from thirty-five patients, and seven of the animals—20 per cent.—became tuberculous. His histological researches, however, only revealed evidence of tubercle in four—5.7 per cent. It has been urged against his high percentage of twenty that he probably introduced into his guinea pigs baccilli contained in the surface secretion of the adenoids, the actual hypertrophy being free from any tuberculous focus.

Large numbers of other micro-organisms are to be found lying both on the free surface, and in the crypts of adenoids. M'Bride and Turner found these to be chiefly micrococci, with a few short baccilli. Occasional colonies of *leptothrix buccalis* may be seen. The presence of micro-organisms in adenoid masses must not be forgotten, as they may be a source of danger.

Gourc, from the examination of 213 cases, concluded that there is no bactericidal property in the secretion of the glands, and probably none in the nasal mucus. In twenty-five cases examined no bacilli were disclosed; in thirty-seven streptococci were found, but never pure; in sixty staphylococci were met with, pure; and in sixty-nine associated with other micro-organisms; of other forms of cocci, he found forty-one pure and fifty-four associated; and there was in one case a short bacillus, which did not take Gram's stain. Pneumococci occurred in three; there was one pure leptothrix buccalis, and one associated. Although there was collateral tuberculosis in thirty of the cases, hereditary in eighteen, and personal in seventeen, yet Koch's tubercle bacillus was never once discovered in the adenoid growth.

A series of adenoid growths were examined for me recently by Dr. Eastes. In no single specimen were there any microscopic proofs of tuberculous systems demonstrable, and in no case were any tubercle bacilli found. No other micro-organisms were found either, save in one specimen, in which, in the folds of the epithelium, as it followed the regular contour of the adenoid mass, were portions of muco-purulent material, in which were bacteria. This adenoid also contained microscopical evidences of a sub-acute inflammation. This specimen is interesting from the point of view of the occurrence of suppurative ear complications.

The very large majority of the growths were of the purely lymphoid type. In several of the adenoids were old hæmorrhages, which had become decolourised, and had undergone partial absorption.

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CHAPTER IV.

SYMPTOMS AND COMPLICATIONS.

We now come to one of the most important parts of the discussion of hypertrophy of the pharyngeal tonsil, that of symptomatology. This subject, as will have been gathered, offers a wide field. The symptoms of adenoids are so protean, so far reaching in their occurrence, that it is difficult to know where to begin their description, and how to end it. It is my intention, therefore, to endeavour to classify them as simply as may be. This is not altogether an easy task, as it is often difficult to clearly separate into groups symptoms whose origin may be directly due to the changes in the pharyngeal walls, or to reflex phenomena induced thereby.

In all well pronounced cases of adenoids, the most prominent symptoms are those of nasal obstruction. But there are others caused by their general effect on the system. In the following classification it must be remembered that no strict line of demarcation can be drawn between the several groups, and that therefore the system is one rather of convenience. For instance, symptoms referable to affections of the respiratory system are themselves originally caused by the nasal obstruction, and, strictly speaking, the troubles due to aural diseases are primarily due to the cause of the ear maladies themselves, which again ultimately resolves itself into the nasal obstruction resulting from the presence of the growth. Many of the effects upon the general system, again, originate in the want of proper aëration of the blood, due to the respiratory deficiencies caused by nasal obstruction, and many of the reflex phenomena owe their origin to the same fundamental cause.

For convenience of description, therefore, be it understood that I have adopted the following classification:—

1. Symptoms due to the effects of nasal obstruction.
2. Symptoms due to affections of the respiratory system.
3. Symptoms due to the effects upon the general system.
4. Symptoms due to the effects upon the ear.
5. Reflex symptoms.

1. *Symptoms due to the effects of nasal obstruction.*—Prominent among these are the adenoid facies, mouth-breathing, the adenoid voice, snoring, etc. As these are of such common occurrence they will be taken first, commencing with—

The Adenoid Facies.—The classical appearance of a patient suffering from adenoids is well known, and cannot be mistaken. Given a child with a vacuous, stupid facial expression, dull and heavy-eyed, thin, narrow nostrils, the bridge of the nose broad, the mouth always half open, the voice dull and muffled, the subject of disturbed sleep and snoring, and with a more or less constant nasal discharge, which by its irritation probably excoriates the upper lip, and in ninety-nine cases out of a hundred it will be found that the subject is the victim of adenoids. But, however, it is important to remember that the adenoid face may be present, without the occurrence of hypertrophy of the pharyngeal tonsil, and, conversely, that the growths may occur without the characteristic face. It is necessary, therefore, to study the adenoid facies in detail. The matter has been admirably discussed by De Champeaux, and it is worth while reproducing here his conclusions. He remarks that persons may be the subjects of adenoids without possessing the adenoid face, and, similarly, individuals may have the adenoid face without adenoids. He therefore divides his cases into three groups:—

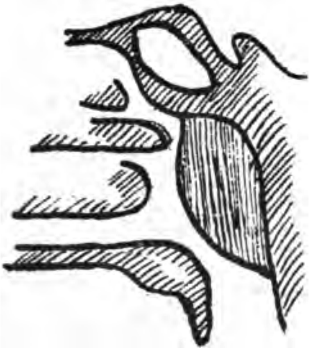

FIG. 10. Adenoids obstructing the posterior nares (after De Champeaux).

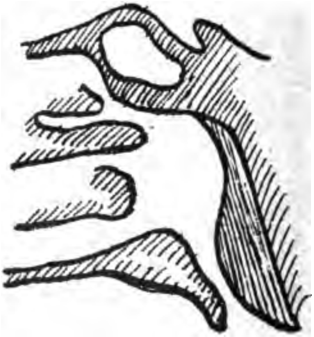

FIG. 11. Adenoids not obstructing the posterior nares (after De Champeaux).

1. Adenoid faces with adenoids.
2. Adenoid faces without adenoids.
3. Adenoids without adenoid faces.

1. In the first group the consequences of the disease show themselves sooner or later; the voice is nasal, the child hears badly, he has ear, nose, laryngeal, and bronchial symptoms, tends to catch cold on the slightest provocation; often has enlarged tonsils superadded. In these cases there can be no doubt of the diagnosis, which the finger behind the soft palate confirms.

2. In the second group the mouth is open, the palatal arch pointed, the teeth badly arranged, the patient snores at night, generally the tonsils are not enlarged, respiration is buccal, and cannot be carried on through the nose. In these patients ear affections readily yield to treatment, and the finger in the post-nasal space finds no adenoids.

3. In the third group the mouth is usually closed, and the patient snores but little; ear symptoms are not common, and hearing is generally fair; but in place thereof laryngo-bronchial symptoms predominate; there is continual cough, especially in the morning; laryngitis and attacks of aphonia or hoarseness are frequent; on depressing the tongue more or less granular-looking masses can be seen on the pharyngeal wall. The finger in the post-nasal space finds adenoids very fairly developed on the posterior wall of the naso-pharynx, but the choanæ are free. Sometimes there are nasal symptoms (attacks of sneezing, coryza), but they are intermittent when compared with the laryngo-bronchial attacks, and in no case do they reach the same intensity as do the nasal symptoms in the first and second groups. These patients have enlarged tonsils less often than do those in the first class.

For this condition of things there must be a reason, and the probable explanation is this: The adenoid type of face results from a failure in equal development between the upper and lower parts of the face, which explains the presence of the adenoid face in those in whom the growths are absent, nasal obstruction from other causes bringing it about. This atrophy of an organ which is not used (the nasal fossa) perfectly accounts for the adenoid face in those who have adenoids.

But the occasional absence of the characteristic type in adenoid patients must also be accounted for. The existence of the adenoid face depends upon whether the hypertrophy of the pharyngeal tonsil causes nasal obstruction or not; such a type of face may accompany any other form of nasal obstruction, such as hypertrophic rhinitis, deviated septum, or large spurs, and De Champeaux suggests that the term "adenoid face" be replaced by that of "face of the type of nasal obstruction," or, more simply, "nasal face." This would explain his third group of cases, in which the adenoids do not cause true obstruction to nasal breathing. The appended figures (Figs. 10 and 11) show how different forms of adenoid growth may or may not cause obstruction to proper nasal respiration.

In Fig. 12 is shown a distinctly characteristic face of the adenoid type. This is from a case published by Escat. The mouth is wide open, with crowded, irregular, teeth, the upper lip is hitched up, with the lower one drooping and expressionless. The nose is thin, and the nostril reduced to a narrow slit, the alæ are ill-defined, and there is atrophy of the elevators of the upper lip. The hard palate was highly arched, the thorax narrow and laterally compressed, the patient had been a mouth breather from childhood, and snored at night. His face was, however, merely the outcome of nasal obstruction, due to congenital stenosis of the upper air passages, occurring in a hereditary degenerate. Examination showed that the mucosa of the nose and naso-pharynx were entirely free from any chronic dis-order, there were neither catarrh, nor enlarged tonsils, nor adenoids present. The facial angle only measured 60 degrees, and the whole face bears the stigmata of degeneration. The patient was an imbecile, subject to epilepsy, with delirium consequent on the attacks, and he was placed in an asylum at the age of twenty-two years.

It will therefore be seen that, although the adenoid face is a frequent and important sign of adenoids, it must not be taken for granted that because it is present it is the outcome of the growths whose name it bears.

At the same time the type is so common in connection with adenoids that it is necessary to give some description of it in detail. The natural nasal breathing being replaced by mouth breathing causes the plastic features of the young to respond to the change. The nostrils become pinched, and their openings, which look more forward than downward in the child, become permanently fixed in that position, giving a very unpleasant appearance to the face. A thickening of the nostrils, and a loss of their curves is also often present, due to chronic eczema from the irritating purulent discharge which issues from the nose. The general shape of the nose is by no means constant, but there may be recognised two very distinct types, possessing opposite characteristics; the whole features may be sharp, the nose being narrow from base to tip, or the organ may be pronouncedly " snub."

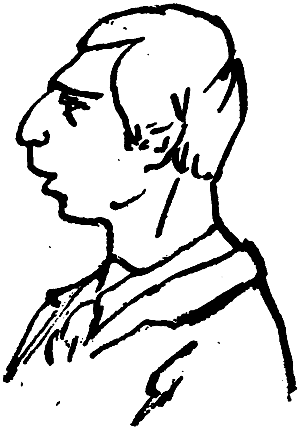

FIG. 12. Congenital Stenosis of the nasal fossæ and naso-pharynx (after Escat).

The eyes are often expressionless, and there is a curious raising of the under eyelid, which gives rise to what Meyer aptly termed the " veiled look."

The alterations in the mouth are no less striking. The lips are always parted, and the upper one appears thickened. Changes in the palate are usual (to which I have already referred at some length in Chapter II.). This is generally found to consist in a high arching, with irregularity of the teeth. The effect of this narrowing of the alveolar arch is to push forward the teeth, and make the upper lip project. Continuous mouth breathing results in the more rapid than ordinary accumulation of tartar on the teeth, and renders the latter more prone to dental caries.

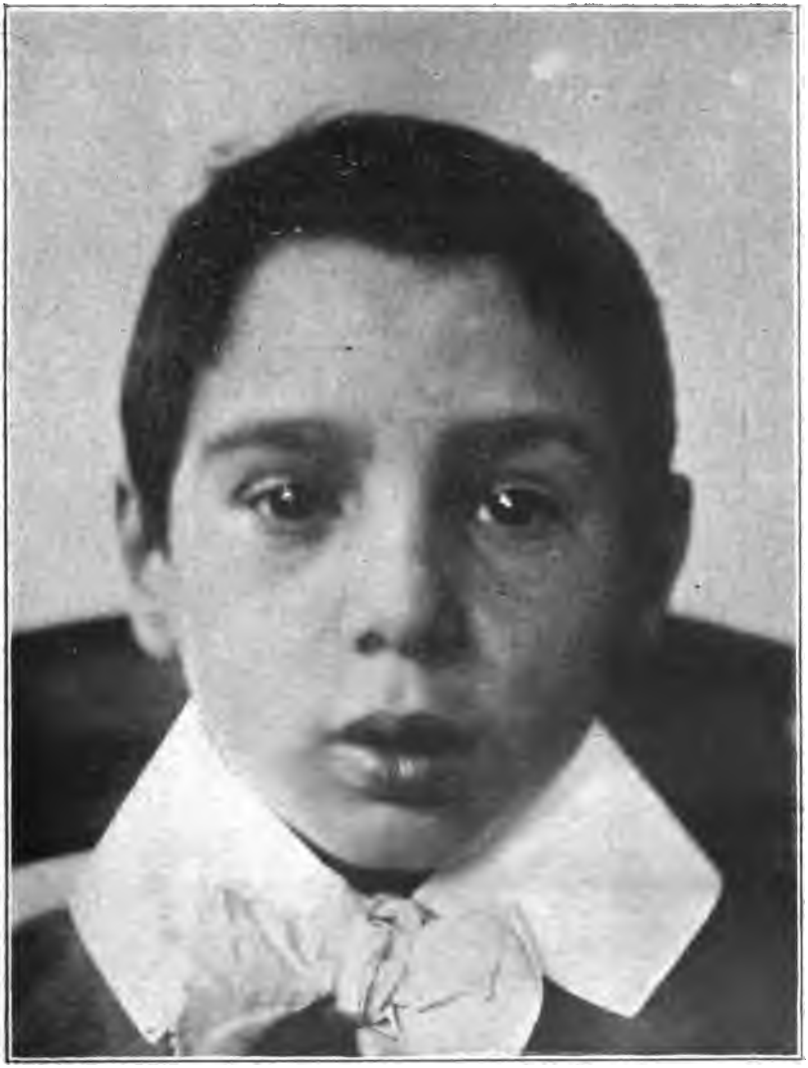

FIG. 13. Boy of 9 with adenoids.

Another result of the narrowing of the arch is that it makes the malar bones appear more prominent.

The lower jaw is drooping, and this is due to the open mouth, and there seems to exist some correlation between the closure of the lips and jaws. The open mouth and dropped jaw give a stupid expression to the face, and the position of the lower jaw, together with the want of tone in the muscles which move it, make the chin appear misplaced downwards and backwards and to be wanting in development, especially as to its prominence. Figs. 13, 14, and 15 are from photographs, and show well the adenoid type of face.

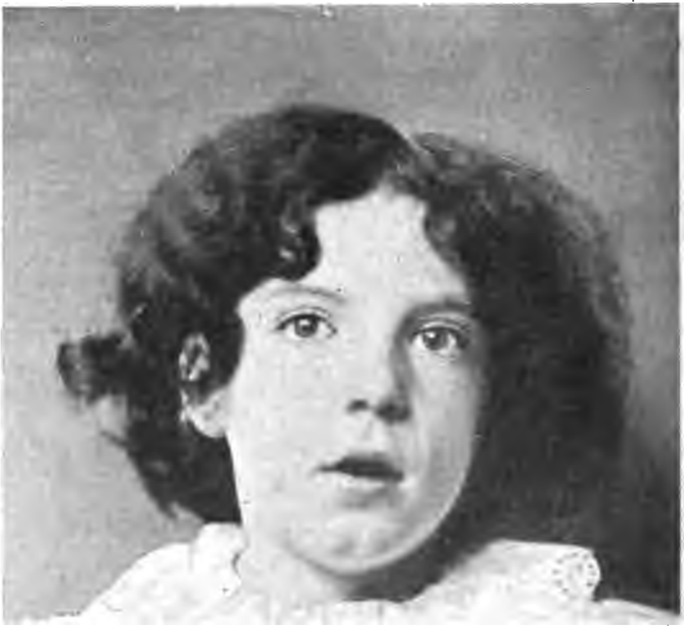

FIG. 14. Girl of 7 with adenoids.

Let us take next the well-known so-called *adenoid speech.*

This again might well be renamed " nasal speech." It is characterised by a deadness or want of resonance, and especially by the faulty enunciation of the letters " *m* " and " *n*." To detect this defect of speech the patient should be made to pronounce such words and phrases as " mother," " Clapham Common," " Nicholson's Nek," and, in a majority of cases this type of speech will be found to be as common, or even more common, than the adenoid face, so that it may be almost considered sufficient for purposes of diagnosis. One can often diagnose adenoids by the voice of the street newsboy. The voice soon gets tired, especially in older patients, and in those who have to make the voice heard, as in teachers, the want of resonance

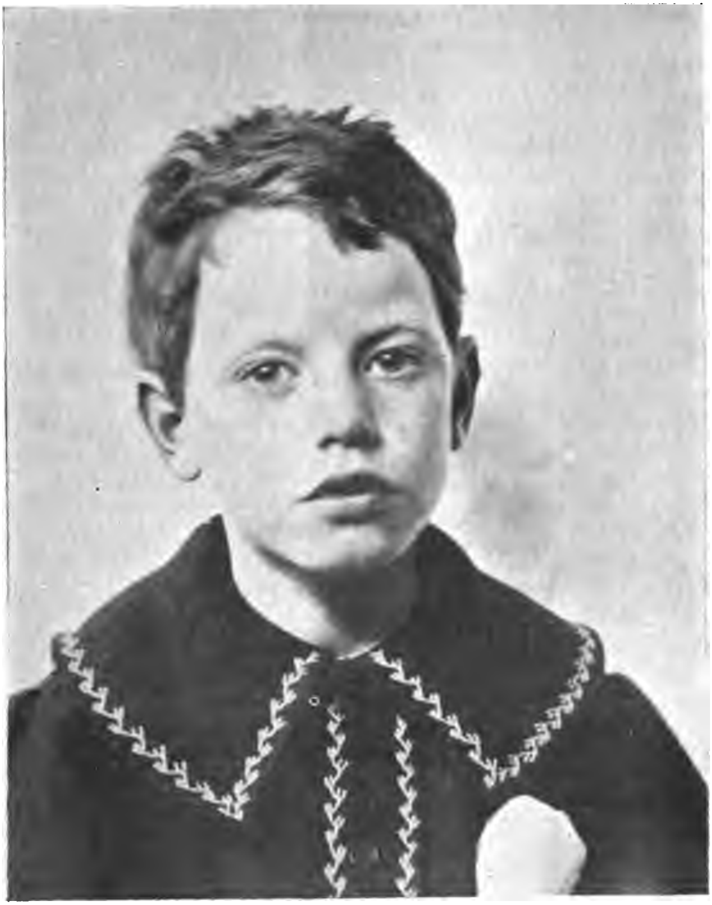

FIG. 15. Boy of 8 with adenoids.

necessitates more or less shouting, which in some cases leads to chronic laryngitis.

Impediments of speech, apart from the characteristic nasal speech above described, are fairly frequent in adenoids. Whether in such cases, the conditions stand to each other in the relation of cause and effect is doubted by some observers, but in my opinion they are frequently so. In my 307 cases, *stuttering* was marked in two (one male and one female), and in both cases the symptom was greatly improved by the removal of the adenoids. M'Bride and Logan Turner had difficulty in believing that stammering and stuttering are often, if ever, produced in this way, but they record a case in which marked improvement in pronunciation followed operation, and in which the friends attributed it to this cause alone. The case was that of a child with good hearing and intellect, and who could pronounce *m* and *n* in *common* perfectly. Through inability to pronounce a number of consonants his speech was difficult to understand; thus *c* became *e*, *f* equalled *et*, *g* equalled *te*, *h* equalled *ate*, *j* equalled *ta*, *s* equalled *et*, *v* equalled *e*, *x* equalled *et*, and *y* equalled *i* in his vocabulary. After the operation he began to improve, and he later spoke like other people. One case of my own recalls itself to me in this regard. This was a lady aged about twenty-five, who was deaf in one ear, and was the subject of a fairly large pad of adenoids. She stammered in a fashion that made conversation equally painful to herself and her audience. Attempts at training by careful and experienced masters brought no relief, until one of the latter sent her to me for consultation. After operation she immediately began to improve, and a month's continuation of her lessons quickly completed the cure and overcame her impediment.

Among stammerers, Mygind has given the proportion of those who have adenoids as 39 per cent. The growths seem to have some effect in delaying the acquirement of speech in a certain number of backward children, but this is probably more due to the tardy development of the mental powers than to any direct local effect of the adenoids themselves. This matter will receive further consideration when dealing with adenoids and deaf-mutism.

The evil effects of *mouth-breathing* are well known to every rhinologist. The respiratory function of the nose is, as has been shown by the experiments of Greville MacDonald and others, that of warming and moistening the inspired air. It has been demonstrated that in cold weather the air entering the lungs may be warmed by the nose as much as thirty degrees. There is in addition the filtering and freeing from impurities that the air undergoes during its passage through the nasal chambers. The effect of this loss of function can be easily imagined, and in a work like this there is no need to do more than give an outline of what takes place when it is in abeyance. The air, cold, dry, and laden with gross and minute impurities, and furnished thereby with a deleterious action both mechanical and chemical, reaches the air passages in a condition which serves more to irritate than to assist in the normal process of respiration. Long continued action of this kind brings about a condition of chronic irritation, leading to chronic congestion and later chronic inflammation of the upper air passages, pharyngitis, laryngitis, tracheitis, and bronchitis. Further, in the mouth-breather, sufficient air is not inhaled, and therefore the blood is not properly oxygenised, and is surcharged with carbon dioxide. This excess of CO_2 causes lassitude, headache, stupidity and sleepiness, and gradually renders the nerves of special sense less active and responsive to stimuli. The excess of CO_2 and the lack of oxygen is the cause of the loss of appetite, malnutrition, and general cachexia so often found to accompany mouth-breathing.

The frequency of mouth-breathing in adenoids is very noticeable. Arrowsmith found it to occur in no less than 586 cases out of 700. Of my 307 cases, in 138 (seventy-eight males and sixty females) the condition was marked; in the remaining 169, 100 showed it only at night, fifty-four showed it to a slight extent, and only fifteen were nasal breathers.

A very prominent symptom of mouth breathing is noisy respiration and especially *snoring*. This latter occurred in ninety per cent. of Crowley's cases. Usually the greatest amount of discomfort in mouth-breathing occurs at night, owing to the accumation of secretions about the choanæ and the consequent irritation and swelling of the turbinals, as well as to the imperfect aëration of the blood. It will nearly always be found that those who snore at night are the cases in which disturbed and restless sleep is most complained of. The embarrassment of breathing results in semi-suffocative attacks, which cause the patient to toss about and moan in his sleep, and to suffer from that common and distressing symptom of childhood—*night terrors*. This last-named symptom requires mention at some length, for it is one of very frequent occurrence in adenoid cases. Syers quotes Kinglake's admirable description of his own experiences as a child, and the passage, occurring in "Eothen," is worth reproduction here:—"When I was very young (between the ages, I believe, of three and five years old), being then of delicate health, I was often in time of night the victim of a strange kind of mental oppression. I lay in my bed perfectly conscious, and with open eyes, but without power to speak or move, and all the while my brain was oppressed to distraction by the presence of a single and abstract idea—the idea of solid Immensity. It seemed to me in my agonies that the horror of this visitation arose from its coming upon me without form or shape—that the close presence of the direst monster ever bred in hell would have been a thousand times more tolerable than that simple idea of solid size; my aching mind was fixed and riveted down upon the mere quality of vastness; and was not permitted to invest with it any particular object. If I could have done so, the torment would have ceased." This describes very vividly one of the forms of night terror which is by no means uncommon. These waking dreams not seldom occur, although the form which occurs during actual sleep is the most frequently met with.

In analysing the symptoms of adenoids I have paid particular attention to this very distressing phenomenon in children. Of the 307 cases, it was exhibited in varying degrees in fifty per cent., and in forty-two (nineteen males, twenty-three females) it was sufficiently marked to be a cause of voluntary complaint by parents, or by the patients themselves. Children who are old enough to understand the surgeon's questions will often give singularly clear descriptions of their night terrors to a sympathetic listener, and many adults who have been the subjects of adenoids or some other form of nasal obstruction in their childhood, or who present the remains of the growths, will be found to have indelible recollections of their sufferings from this cause, if they do not still experience them. Night terrors vary from simple restlessness, with disturbed and moaning sleep, to horrible and clearly defined dreams, from which the percipient awakes shrieking and trembling in an agony of fear. There can be no doubt that this symptom is the outcome of the want of properly aërated blood during the hours of sleep, and very often the nature of the dreams point to this. It is by no means uncommon to find that these take the form of drowning or being smothered. I have been able to obtain singularly clear descriptions of such dreams, without putting any leading questions, from several children. One told me that he was always dreaming of being "smothered with pillows," and another that he had an oft recurring vision of shipwreck and drowning. One little boy, on being asked what he dreamed about mostly, said "Burglars," adding later "They come and smother me."

In one case, a girl of thirteen, the symptom was complicated with distinct *sonambulism,* the patient walking in her sleep. As, however, an operation was refused, it is not possible to say definitely how far this depended upon the adenoids.

M'Bride and Turner describe the case of a child, aged fifteen months, who suffered from periodic earache and constant sleeplessness, never resting for more than half-an-hour at a time, and then awaking with a cry. This child did not snore, had no difficulty in feeding, and throve well, while during the day he was happy and good-tempered. The adenoids were detected in trying to discover a cause for the recurrent subacute attacks of middle-ear inflammation; they were in considerable amount, and from the time of their removal the child slept well.

Although these disturbances of sleep are so common, it is not rare to meet with cases in which the sleep is, on the contrary, sound and heavy. This is not always due to the adenoids being insufficient in amount to cause much obstruction, but is, I think more the result of improper oxygenation of the blood acting on the brain; such cases are usually found to exhibit marked aprosexia, and to awake comparatively unrefreshed.

From this symptom I pass to the effect of adenoids upon the *mental condition* of the patient. This, apart from the difficulties of education when there is much deafness to be contended with, is a subject of very great importance. The condition to which Guye, of Amsterdam, applied in 1887 the apt term "*aprosexia*" (defective power of attention) is given by various authors as occurring in from thirty-five to seventy per cent.—a wide margin. Among congenital idiots, adenoids are verv frequent. Certainly it is a condition that one sees very frequently, and one is somewhat prone to consider that most adenoid children are dull and wanting in intelligence. Often, however, this is by no means so, and some of them are particularly sharp. In my 307 cases, I only found aprosexia a very marked symptom in seventeen instances (eight males and nine females). In all of them the amount of adenoids was large, and the obstruction to nasal breathing severe, and in nine of them the tonsils were also markedly hypertrophied. Crowley found aprosexia present in only 28 per cent. of his cases, and remarks that over half his cases were particularly sharp, at any rate in their mothers' estimation. He further considered that in many cases the dulness is more apparent than real, the child appearing dull because deaf. I am inclined to agree with this opinion, as my percentage of marked cases of aprosexia was small. At the same time the majority of cases showed it to a lesser degree, and in many it is denied by the parents, who often—very naturally—do not care to admit that their offspring are in any way behind normal children in their mental capacity. But, whatever may be the relative frequency of aprosexia, it is an undoubted fact that the removal of these growths will often transform a child remarkable for its seemingly hopeless stupidity into a being of ordinary, or even extraordinary, receptivity and intelligence. One shudders to think how many unhappy children have suffered cruel punishment on account of their adenoids before Meyer drew attention to the cause of their apparent stupidity, and schoolmasters and parents became alive to their significance. To my mind the masterly descriptions by Dickens of the schools of the last century always call up visions of unhappy, unhealthy, uncared-for adenoid children.

This deficient mental condition consists chiefly in a want of concentration. In adenoid subjects mental concentration seems to be impossible, or the effort necessary for it appears to exhaust them in a very short time. Continental writers seem inclined to attribute this to the lymphatic connection which has been shown

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to exist between the nose and the subarachnoid space. It may be due to some hindrance to the cerebral hæmic or lymphatic circulation. Probably the deficient oxygenation of the blood which is supplied to the brain has much to do with it. Possibly also the feeling of discomfort and oppression which attends Eustachian obstruction is another factor.

In my opinion, the mental condition varies greatly with the amount of obstruction to proper respiration present. As I have just pointed out, all those of my cases in which aprosexia was present to a marked degree were the subjects of large adenoid pads, and the obstruction to nasal breathing was severe. For instance, two of my cases, brother and sister, were in marked contrast to one another. The boy, aged five, had suffered with deafness in both ears and discharge from one for two or three years. Sequestra were removed from the discharging ear, and the neck showed signs of old cervical abscesses. He had a large pad of adenoids entirely blocking the naso-pharynx, and his aspect and the aprosexia present were remarkably characteristic. His sister, aged four years, complained of her throat "hurting her," and occasional burning pain in the right ear. She was subject to colds. Otherwise she was a well-developed, healthy child. Her aspect was bright and engaging, and she presented no facial signs of adenoids. Her intelligence and sharpness were exceptional. She was, however, the subject of a medium-sized pad of hypertrophy, situated mostly on the posterior wall of the naso-pharynx, which did not cause much obstruction, as her post-nasal space was fairly roomy for a child of her age.

Apart from aprosexia, the effects of adenoids upon the temper and general disposition of a child are very noticeable. Many such children are fretful, sulky, or liable to outbursts of passionate temper, and difficult to manage. I have known children change markedly in this regard after an operation for adenoids, and I have also known uncertainty of temper in adults similarly relieved.

Headache, often a symptom of nasal obstruction, is also met with in adenoid cases. Crowley noted its occurrence in 55 per cent. of his cases, and remarks that this symptom is not so generally recognised as it should be. M'Bride and Turner, on the contrary, did not meet with a single instance in their cases, numbering 500. Arrowsmith found headache fairly often, and I have certainly noted its frequent occurrence. Such headache is mainly frontal in character, and is often rather a sensation of weight and pressure than of acute pain. It is undoubtedly due to the deficient oxygenation of the blood, and to interference with the proper lymph circulation. Probably also the changes that have been noted in the blood have much to do with its occurrence.

2. *Symptoms due to affections of the respiratory system.*—In dealing with this group it must be again remembered that the

symptoms and complications therein contained are largely dependent upon the amount of nasal obstruction, and that they are only thus grouped for the sake of convenience. The phenomena to be discussed in this place are the tendency to colds, adenoiditis, changes in the nose, laryngitis, laryngeal stridor, laryngismus stridulus, asthma, bronchitis, pulmonary phthisis, and diphtheria, and to these I have added—again for convenience—the association with enlargement of the faucial tonsils.

Adenoids distinctly predispose to the occurrence of *colds*. One of their most important results is the strong predisposition they impart to affections of the upper air passages. It will be found that in nearly every case that presents itself there is a marked tendency to the frequent catching of colds, and the large majority of the results as to aural complications are directly due to this predisposition.

During colds the pharyngeal hypertrophy swells, and the symptoms become intensified. In exceptional cases the adenoid mass becomes affected with a condition which is exactly similar to follicular tonsillitis. M'Bride and Turner relate the following case of this condition: The patient, a boy aged thirteen years, had a temperature of 100 degrees, and a pulse of 106 per minute. He looked ill, and on examining his naso-pharynx with the posterior rhinoscope, the hypertrophied pharyngeal tonsil was found to be studded with white spots.

I have elsewhere published a very similar case, which reminds us strongly of the patients whose lives are rendered a burden by frequently recurring attacks of follicular tonsillitis. The patient was a boy aged nine years. His attacks were frequent, and were ushered in by fever, pain in the post-nasal space, and headache. Examination with the posterior rhinoscope, when an attack was subsiding, revealed an adenoid mass with very much the same appearance as that of a follicular tonsillitis—whitish masses protruding from the furrows of the growth. Operation was refused, and the case was lost sight of.

Moure has drawn attention to the not infrequent occurrence of acute and sub-acute inflammation of adenoids (*adenoiditis*) in the adult, and remarks that it is an accident which has been observed at any age up to fifty-five. As direct or predisposing causes of such attacks he gives acute coryza, follicular tonsillitis (by extension), pus infection from sinusitis, rheumatism, the menopause, and syphilis. The nasal mucosa and the posterior pharyngeal wall may be normal in appearance, while the patient complains of nasal obstruction, with loss of nasal resonance, deafness, tinnitus, and an unaccustomed dropping of muco-pus from the post-nasal space. Posterior rhinoscopy reveals a variable degree of redness and swelling of the post-nasal adenoid tissue, with discharge of muco-purulent or serous matter from the crypts. In at least one of his cases bacteriological examination proved the presence of the pneumococcus of Friedlander as the predominating micro-organism. The lips of the Eustachian orifice are swollen, and there are usually signs of acute or chronic middle ear catarrh. When these attacks occur in the child, fever and general symptoms are prominent, but in the adult febrile manifestations are extremely rare.

Tornwaldt's disease requires mention in connection with this inflammation of adenoids. This malady, which is a cause of obstinate post-nasal catarrh, is a direct result of the retrogression of neglected adenoids. The partially closed median cleft of the pharyngeal tonsil has been named the " pharyngeal bursa," and Tornwaldt's disease is simply a chronic inflammation of this sac.

Adenoid remains in the adult may give rise to very obstinate post-nasal catarrh, the rough and irregular surface secreting an excess of mucus most annoying to the patient. Fœtid breath may be occasionally caused by adenoids. M'Bride and Turner relate the case of a young lady, aged twenty-three, in whom this was the only symptom complained of. The fœtor completely disappeared after operation, though there was nothing in the removed tissue to account for it.

The *changes in the nose* brought about by adenoids are many. They are due to the effects of the changes of atmospheric pressure dependent upon the obstruction in the naso-pharynx, and also partly to the loss, or abeyance of function of the nasal chambers. Stenosis of the nose from want of exercise has been already referred to when speaking of the adenoid facies. Enlargement, passing on to true hypertrophy, of the inferior turbinals is common, especially affecting the posterior extremities of those bodies. Deviations of the septum are, undoubtedly, brought about from abnormal conditions of the atmospheric pressure in the nasal chambers during the period of their development. Spurs may also be similarly caused. But atmospheric conditions are not alone responsible for changes in the nose. Recurrent attacks of acute and sub-acute rhinitis, passing, if neglected, into chronic catarrh, exercise an important influence. A muco-purulent discharge is a prominent symptom of adenoids, and is present in at least 60 per cent. of cases. The irritation of this discharge is frequently the cause of eczematous conditions about the nostrils and upper lip.

Epistaxis is said by some observers to be of frequent occurrence, but I have not myself noted it as often present. Crowley found it in 14 per cent. of his cases. Perversions of smell and taste are frequent, and in one case of M'Bride and Turner, a boy aged five years, the parents noted that he did not begin to enjoy and appreciate the taste of food until after operation.

While speaking of epistaxis, I may here mention a symptom which is, in my experience, rare—that of spontaneous hæmorrhage. The patient, a little girl, aged six and a half years, was brought to me in 1893 for "blood-spitting." She had discharge from both ears, with occasional pain. She was a mouth-breather, with characteristic adenoid face, and complained of cough. Careful examination of the chest revealed no physical signs. The "blood-spitting" had begun fourteen days before her appearance at my clinic. On examination, blood was seen to be coming down from behind the soft palate. She had a large mass of very soft adenoids, which were removed under chloroform. The result of the operation as regards mouth-breathing and ears was excellent, and she had no recurrence of the hæmorrhage.

Atrophic rhinitis (I do not speak of true ozœna, which is said never to occur as a result of adenoids) following on the hypertrophic form is not seldom remarked.

Laryngitis, both acute and chronic, is met with in adenoids, more especially in adults. O'Kinealy found the larynx to be in a condition of chronic congestion in twenty-one cases out of 100. One of them had paralysis of the left vocal cord and left half of the soft palate. The condition is due to the drying of the larynx, which results from mouth-breathing, and to the dropping of discharge into it from the naso-pharynx. Chaumier believes that adenoids are at the root of many cases of recurring *tracheitis*, *bronchitis*, and *broncho-pneumonia* in children. The interference with the free entrance of air favours the development of any special micro-organisms which are the immediate causes of these affections of the respiratory organs. The same holds good, he thinks, for *pneumonia* also. It will be remembered that the pneumo-coccus of Friedlander has been already mentioned as having been found in adenoid growths.

Of my 307 cases, fourteen (twelve males and two females) showed a tendency to very frequent attacks of bronchitis, and one of these died of pulmonary tuberculosis. Putting aside the occurrence of latent tuberculosis in the pharyngeal tonsil, which has been already discussed at length when dealing with pathology, there can be no doubt that by their interference with proper nasal breathing and the consequent tendency that they exert to respiratory troubles, adenoids are a potent factor in the predisposition to *phthisis*.

In adults, long continued overstrain of the voice as a result of the endeavour to overcome its want of resonance, may produce a condition of hypertrophic laryngitis, as in the case of a young board-school teacher recorded by St. Clair Thomson.

Laryngeal Stridor.—Some time ago Eustace Smith expressed the opinion that laryngeal stridor was sometimes the outcome of the irritation due to adenoids. He has described a case in an infant aged one month, in which attacks of laryngeal stridor and laryngismus stridulus was permanently benefited by the removal of the growths. Lack, in a criticism of the former writer's paper, considers that the condition in the case recorded was more likely due to congenital deformity of the upper laryngeal aperture. Thompson and Logan Turner recently investigated the ætiology of laryngeal stridor, and concluded that "the neurosis causing the symptoms does not seem to depend on the presence of adenoids or other obvious cause of reflex irritation." In my opinion, however, *laryngismus stridulus* is at times decidedly caused by adenoids. Convulsions in children are not rare in those who are mouth-breathers. The tongue cleaves to the roof of the mouth, and after a rapid cyanosis a convulsion results, sometimes ending in an attack of laryngismus stridulus. In these cases of nasal obstruction, the voice is noticeably changed. Bowen has called attention to the occurrence of these convulsions in adenoid subjects in an instructive article. In my 307 cases, two patients (both males) suffered from frequent and alarming attacks of laryngismus stridulus, which completely disappeared after operation. Orrin Smith goes so far as to believe that in all cases of ordinary croup there exists some hyperplasia of the pharyngeal tonsil. Arrowsmith considers that laryngismus stridulus, or "false croup," often results from adenoids, and that it is due to the drying of the larynx from mouth-breathing, or from irritation of secretion dropping from above, or from reflex swelling of the lymphoid tissue about the top of the larynx.

Asthma.—Bronchial asthma is met with in both children and adults as a result of adenoids. In children the mucous membrane of the bronchi has not yet attained the degree of tolerance which is seen in those of more advanced years, and the air, partly or wholly inhaled through the mouth when nasal obstruction is present, acts as a distinct irritant, varying in degree with the temperature of the atmosphere and the season of the year. This accounts for the prevalence of bronchial troubles in adenoids. According to Lepoutre, adenoids produce asthma as a reflex disturbance, the origin of the reflex being the nasal obstruction, which causes insufficiency of haematosis, compels the patient to make more forced and frequent respiratory efforts, and precipitates a nervous paroxysm. Personally, I consider that asthma due to adenoids, though it undoubtedly occurs in children, is more common in adults; in the former, one is more likely to meet with croupy symptoms than with genuine asthma. Francis has recorded a case of severe asthma in a child cured by him by operation on adenoids.

Besides the above respiratory manifestations, cough, of a reflex nature and of a hoarse, barking, useless character, is frequently met with in adenoid cases.

Diphtheria.—There can be no doubt that adenoids both predispose to diphtheria and render the prognosis of that disease more serious when it occurs.

The effect of adenoids in producing certain deformities of the chest will receive attention later.

I shall discuss here, for the sake of convenience, the association of adenoids with enlarged tonsils.

A certain number of adenoid cases are thus associated, and various observers give varying statistics. M'Bride and Turner, out of 427 cases, only found twenty-nine—6 per cent—with hypertrophied faucial tonsils.

My own cases, 307, showed markedly enlarged tonsils in 131 (sixty males and seventy-one females), and in many of the remainder there was a decided tendency to this complication. I think it will be found that enlarged tonsils are much more frequently accompanied by adenoids than adenoids by enlarged tonsils.

O'Kinealy found enlarged tonsils in seventy-three cases out of 100, a somewhat higher percentage than is usually given.

It is to be expected that inflammatory enlargement of any part of the lymphoid ring of Waldeyer would spread to its other portions, therefore the occurrence of enlargement of the faucial tonsils with hypertrophy of the pharyngeal lymphoid tissue is a natural sequence of events. It is a noteworthy fact, however, that hypertrophy of the lingual tonsil is not often concomitant with adenoids—at least, in my 307 cases, all carefully examined to ascertain whether this complication was common or not, in no instance was enlargement of the lymphoid tissue at the base of the tongue noted.

3. *Symptoms due to the effects upon the general system.*—Under this head I shall discuss the effect of adenoids upon the growth and development of children, their bearing upon deformities, the changes in the blood which they cause, and their effects upon the alimentary and other important systems.

Castex and Malherbe have reported certain observations on the rate of *growth of children* after removal of adenoid vegetations in the naso-pharynx. Measurements were taken before operation, and at varying intervals after. In all, thirty-five cases were traced for three, six, or twelve months. The general conclusion drawn was that during some months after the operation the rate of growth, as estimated by increase of height, weight, and chest measurement, was thrice the average rate as given in the statistical tables of Quetelet for height and weight, and of Pagliani for chest measurement. This conclusion was reached from averages calculated on the assumption that an increase noted in half a year would be half that which would occur in a year. Independent analysis of the tables given by Castex and Malherbe shows that there were great differences in the rates observed in different cases. Thus, two boys, aged respectively twelve and thirteen, were examined after a year. In the former the increase in chest girth was a little above the average, the increase in height practically the same as the average, and in weight a little below. In the other boy the increase in weight was slightly greater than the average, but in height thrice the average. In three girls the improvement was more distinct; in one, aged eleven, the increase in weight and chest girth was very considerably more than a third above the average, though the increase in height was less than the average. In a girl aged twelve, the increase in all three dimensions was more than a third (in chest girth more than a half) above the average. In a girl aged fifteen-and-a-half, the increase in chest girth was more than four times the average (measurement made at the mammary level), and the increase in height and in weight was about twice the average. In a girl aged five-and-a-half, the increase in weight was distinctly below, that in height slightly above the average. In three boys, aged twelve, thirteen, and seventeen, respectively, measured six months after the operation, the weight and chest girth had increased more in that period than in the average boy in a year. But in another boy, aged fourteen-and-a-half, the increase in weight was only slightly greater than the average, and the increase in height and girth was distinctly below the average. In four girls, aged respectively ten, ten, twelve, and seventeen-and-a-half, examined six mouths after the operation, the rate of increase in all three dimensions was very notably in excess of the average.

Without any system of elaborate measurement, it must be patent to all who have much experience of adenoids and the improvements which result from their removal, that it is often very noticeable how children grow, both in height and girth, once the impediment to normal respiration is removed. From the results just described it will be noted that the changes for the better are more patent when the operation has been done in older children, at or near the age of puberty. No one can doubt the influence of adenoids on the general development once they have seen a puny, delicate, sickly, and ill-developed child changed into a healthy individual, able to take his own part and make a good struggle for existence.

These important results upon growth and nutrition arise from the general effects of mouth-breathing. The restless and unrefreshing sleep to which adenoid subjects are habituated must in itself alone seriously interfere with the general health and nutrition; the changes in the blood which result, the disorders of digestion, also have their bearing on the matter. The effect upon the mental development of the child has already received attention.

I have spoken here of *changes in the blood* brought about by adenoids; this in itself is a by no means unimportant subject, and has been made the object of investigation by Lichtwitz and Sabrazes, who made a series of blood examinations in children with these growths both before and after operation. They asked the question: If the poor nutrition of children having adenoids is not due to grave changes in the composition of the blood? For this reason they made examination of the blood in healthy children as well, and came to the following conclusions: Children with adenoids have a mild form of anæmia and leukæmia, also an increase in the large mononucleated cells, viz., the lymph cells and eosin cells, taken by the percentage method, and by absolute count per c.mm., on the contrary a decrease both relative and absolute in the number of polynucleated cells. After the removal of the adenoids, the blood tends to return to the normal; at the same time the body weight increases and the general condition improves. It must be noted, however, that the blood does not always rapidly regain its normal physiological characteristics. Repeated examinations show that the tendency in many cases is towards the leukæmic type, and this tendency is due to many, and not to any, definite causes. However this may be, when the average results are taken into consideration, it is certain that the blood of children with adenoids tends to approach to the normal when the growths have been removed.

The consequences of the continual swallowing of the secretion which accumulates in the post-nasal space in adenoid subjects cannot fail to induce *disorders of the digestive system*, and it is quite possible that the increase in size and weight noted in children after the removal of the growths is partly to be ascribed to a restoration of their assimilative powers, and in cases of chronic gastric and intestinal disorders in children the possibility of adenoids should not be forgotten. In infants the impossibility of proper nasal-breathing prevents efficient suckling, and they consequently often suffer from pronounced inanition. In older children, too, the habit of bolting food without mastication, due to their anxiety to keep the air-way unobstructed, has an obviously ill effect upon digestion. Further, the bad aëration of the blood, and its impoverished condition, will, as has already been pointed out, exercise a mal-influence over the alimentary secretions, and induce increased peristalsis. In this connection there are two conditions which have been described to which reference must be made. Adenoids have been the occasional cause of *hernia*. By some observers this is considered to be due to frequent and forcible attempts at blowing the nose (I may mention here that it is a not infrequent complaint that patients are unable to blow the nose properly), but the general want of tone must also have some influence in the matter. *Prolapse of the rectum* has also been reported. A case is described by Lauffs. The patient was a boy, aged five years, who had suffered for three years from prolapse of the rectum. He was also the subject of a large mass of adenoids, causing mouth-breathing, for which Lauffs was consulted. The adenoids were removed, and immediately after that the prolapse was cured. Lauffs did not consider the case to be one either of simple coincidence or of psychic influence. He pointed out that the patient had increased peristalsis of the bowel on account of the excess of carbonic acid in the blood, due to the irregular respiration which was the outcome of the adenoids. With the removal of the adenoids the peristalsis which caused the prolapse came to an end.

Apart from ear affections which adenoids engender, they may at times be responsible for the *ephemeral attacks of fever* which so often occur, and which are ascribed, in young children, to teething, and in older ones to "growing fever," "ganglionic fever," or to obscure gastric disturbances. I have more than once found that such attacks have been traceable to the adenoiditis mentioned above.

I have deferred mention of the part played by *adenoids in orthopædics* until now, although much of what I have to say might well be included in the second group of my classification.

Coolidge states that he has met with several cases of commencing deformity of a complex type associated with adenoids, and describes six instances to demonstrate the conclusions which he draws, and which are as follows:—

1. Both adenoids and deformities might be an expression of degeneracy.

2. Deformities might occur as a direct result of mechanical obstruction to breathing.

3. Orthopædic deformities occur in tuberculous joint diseases, which may have had their source of infection either directly or indirectly from adenoid vegetations.

4. Deformity may result directly from reflex irritation of the neighbouring nerves by adenoid growths.

5. Lastly, and most important, adenoids may cause such a lowering of the general nervous vitality that they may be considered almost the direct cause of some of the atypical orthopædic deformities whose ætiology is unknown.

I do not think that one need go so far as to form such conclusions regarding the connection of adenoids with deformities. The deformities alluded to by Coolidge are for the most part bilateral, and we must look rather for some general cause than for a purely local one. Here again it is possible that this observer has been confusing cause with effect. Truly adenoids may sometimes be regarded as an expression of degeneracy, their relative frequency in congenital idiots and deaf-mutes would suggest it. But this is but a very small tithe of the causes of adenoids, as will be seen from a perusal of the chapter devoted to ætiology. To suggest that deformities arising from tuberculous joints are due to infection from adenoids is going too far afield, especially when the influence of adenoids upon the production of tuberculosis, save in the way already discussed, is doubtful.

By far the most important bearing of adenoids on orthopædics is the mechanical one in *deformities of the chest.* It is a pity that many general physicians do not pay more attention to their

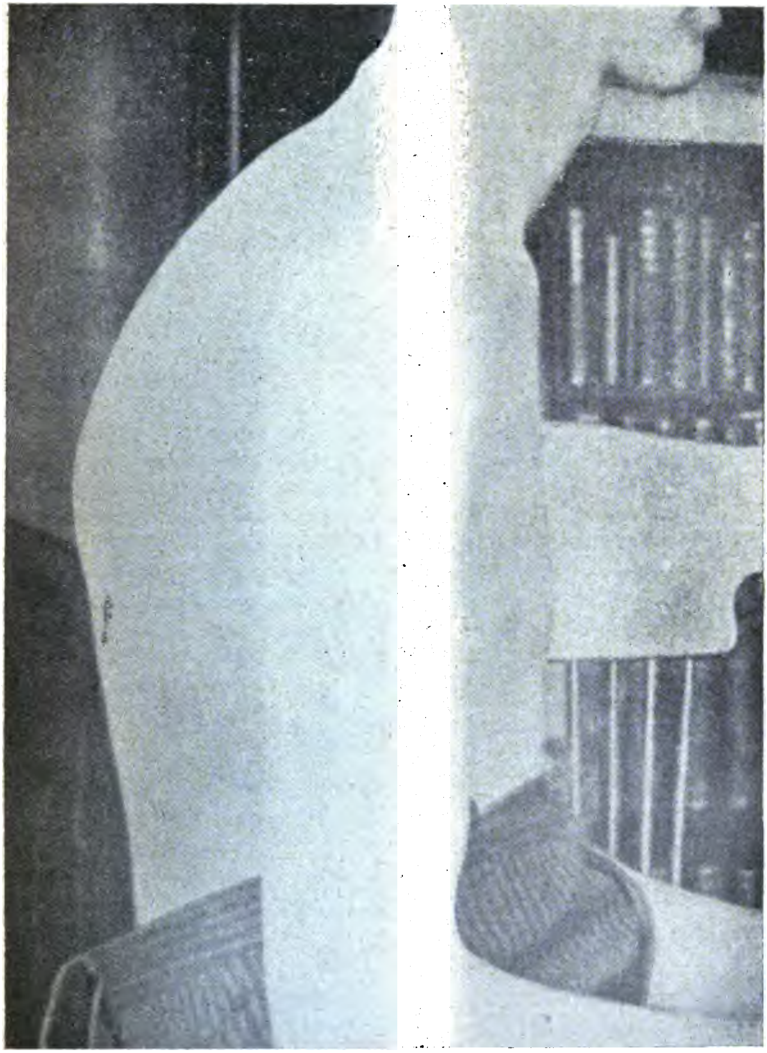

Fig. 18. Chest of an adult with the characteristic deformity from enlarged tonsils and adenoids. The hypertrophied tissues are still present in this case, having never atrophied. He is under treatment for incipient tuberculosis.

of the wall of the external auditory meatus, cholesteatoma, aural polypi, and facial paralysis. Of the 110 cases mastoid inflammation occurred in seven, five being acute and two chronic.

M'Bride and Turner found that out of 500 cases, 304 were more or less deaf, while in 196 the hearing was normal. Of the 304, thirty-two were affected in one ear only. The common form of deafness was Eustachian obstruction, at times associated with the presence of free exudation in the middle ear. In ninety-eight there were evidences of past or present middle ear suppuration, whilst eight patients had sclerosis. In twenty-five cases the most prominent symptom was earache.

Braden Kyle gives "at least 90 per cent." as presenting ear complications in adenoid cases.

In my 307 cases, 225 suffered from some ear complication or another, and of these 114 were cases of suppuration. The following table shows the analysis of these cases:—

		Males.	Females.	Total
Deafness with discharge ...	Both ears	40	50	90
„ „ „ ...	Right ear	18	15	33
„ „ „ ...	Left ear	8	13	21
Totals....................		66	78	144
Deafness without discharge ...	Both ears	52	57	109
„ „ „ ...	Right ear	1	0	1
„ „ „ ...	Left ear	1	0	1
Totals....................		54	57	111
Total cases with ear symptoms		120	135	255

There is no need to go further into statistics to show the great frequency of ear diseases in this malady. It is of more interest and value to discuss the varieties of aural trouble met with, and the way in which they arise.

The hypertrophied pharyngeal tonsil acts upon the ears in four ways:—

1. By causing Eustachian obstruction.
2. By interfering with the lymphatic or vascular circulation of the middle ear.
3. By acting as a nidus of infection.
4. By the frequency with which it causes catarrhal inflammations, which spread up the Eustachian tubes.

Eustachian obstruction may be brought about by adenoids in two ways, by pressure, or by catarrhal inflammations of the tube, the latter probably being the more common. When the adenoids extend into the fossa of Rosenmüller the former condition may occur, as also when the growth is swollen by inflammation, especially in children with small post-nasal capacity. Catarrh spreading up the tube and giving rise to an organised stricture is more likely to occur.

The second group can be readily understood, interference with the lymph and blood circulation being a marked concomitant of adenoids.

As regards the part played by the adenoid mass as a nidus for infection, the naso-pharyngeal space is a "distributing point of infection to the middle ear, brain, lungs, stomach, and intestine," as Pomeroy has aptly put it. Without doubt the part which has to bear the brunt of this is the middle ear. Probably all suppurative conditions of that chamber owe their origin to the entrance of micro-organisms, *viâ* the Eustachian tube. When, added to this , the adenoids have caused an inflammatory condition of the tympanum by continuity *viâ* the tube, with its consequent rise of tension, the micro-organisms find a very suitable cultivation ground. In the normal post-nasal space, with its smooth walls and absence of catarrhal conditions, and with the Eustachian cushions practically isolated, the soil is the reverse of favourable for microbes and their chance of gaining an entrance into the tympanum is very small.

It will be remembered that, when dealing with the pathology of the growths, I pointed out that staphylococci and streptococci were not seldom found in adenoid masses on bacteriological examination. The importance of this fact in the ætiology of suppurative middle ear diseases, in children especially, cannot be over-estimated. Both in children and adults, it is the fate of every surgeon to meet with cases of middle ear discharge which will not clear up until adenoids, perhaps overlooked, were first removed. I would lay particular stress upon this, since several physicians and surgeons of otherwise great reasoning power have tried to promulgate the doctrine that adenoids, as a rule, do not necessitate operation.

We may take the ætiology of middle ear suppuration due to adenoids to be as follows:—

The post-nasal space is occupied by a mass of growth, which is either already the seat of micro-organisms or furnishes them with a very suitable cultivation ground. To this is added a catarrh or local congestion, caused, possibly, by one of the exanthemata, or, more often, by a simple "cold." The micro-organisms present are able to invade the tympanum by way of the Eustachian tube, and by continuity of inflammation, the resisting power of the tissues is reduced, exudation with its resulting increase of tension results, the microbes have a most congenial sphere of activity, and suppuration results.

Surely the possibilities of such a danger as this is sufficient to warrant removal of the offending growths?

The fourth method of attack has been already mentioned in connection with the others, namely the frequency with which adenoids induce catarrhal inflammatory conditions which extend up the Eustachian tubes. To some it may appear superfluous to add this as a fourth method, since its influence in causing suppuration in the middle ear and obstruction in the Eustachian tube has already received attention. But the condition may cause deafness in a third and very important way. Dismissing suppurative conditions, deafness from chronic inflammation of the middle ear is determined by two very distinct pathologico-anatomical facts. The catarrh may mainly affect the Eustachian tube, being practically limited thereto, or it may affect the whole tract of the middle ear. In the former case, the overcoming of the Eustachian obstruction which results, is attended with very gratifying success, while the latter is less hopeful when allowed to go unchecked, and requires careful treatment. These are the cases which later lead to much adhesion and ankylosis of the ossicles, with formation of scar tissue and its attendant evils.

Frequently adults will give a history of discharge during infancy, with other symptoms pointing to adenoids. Possibly it was not treated, because someone had told them, or rather their parents, that they would "grow out of it." Such cases often recover temporarily when the post-nasal space becomes larger at puberty, but the continued presence of the growth and the resulting catarrhs, together with the fact that the ear has once been attacked, renders them prone to recurrence whenever some exciting cause makes its appearance. Such cases, unfortunately, although their discharge has long ceased, are often permanently deaf from the destruction and cicatricial sclerosis which has taken place. These effects of adenoids upon the ear in later life is not one of the least important of their influences.

Ear trouble once established when adenoids exist, tends by their persistence to become chronic.

Further, Braislin has pointed out that he has frequently found children with adenoids with a parent suffering from their results, and he believes that a great part of the apparently inherited ear diseases is in the child the direct, and in the parent the remote effect of the adenoids.

Before leaving the ear complications of adenoids, it will be well to summarise the information which has been obtained.

1. Ear disease is a very frequent complication of adenoids indeed.

2. It is often the presence of pain in, discharge from the ear, or deafness, that draws attention to the growths.

3. Adenoid ear disease tends to become chronic, which indicates an ætiological factor in its production. About puberty some improvement may take place, owing to the greater development of the capacity of the post-nasal space, but the tendency to recurrence remains.

4. Mastoid inflammation is a complication of adenoid ear disease of fairly frequent occurrence.

I shall have occasion to revert again to the subject of the ear symptoms of adenoids when discussing diagnosis and prognosis.

As might be expected in a disease so frequently attended with aural complications, adenoids have been widely discussed in relation to *deaf-mutism.* Jankelevitch examined 158 subjects in the deaf-mute institution at Prague, and found 54½ per cent. affected with adenoid growths, which filled the post-nasal space. Out of this number fifty-six were boys and thirty-eight girls. Bliss found adenoids in 17 per cent. of the deaf-mutes he examined, and Kerr Love puts the proportion at a much higher rate—60 to 70 per cent.—and he points out that Roosa and Beard found that fully two-thirds of deaf-mute children showed pharyngeal disease or enlarged tonsils. Frankenberger has collected very complete statistics, his own observations resulting in the discovery of adenoids in 59.49 per cent. of deaf-mutes. Among normal children Meyer found them in 1 per cent. of 2,000 cases, Doyer in 5 per cent., Schmiegelow in 581 examinations found marked adenoids in 5 per cent., and moderate hypertrophy in 13 per cent., Wróblewski 7 per cent. in 650, and Kafemann 9 per cent. When we come to enquire into deaf-mutes, the percentage is enormously higher. Lemcke found 58 per cent., Aldrich 73 per cent., Wróblewski 57.5 per cent., and Peisson more than 50 per cent. Mygind sums up the whole treatment of deaf-mutism at the close of his work in the following pregnant sentence, which he wisely prints in italics: "Submit all children who suffer from deafness, which threatens to cause or has caused deaf-mutism, to a rational examination of the ears, and of the adjacent mucous membranes, and eventually make the existing disease the subject of a rational treatment."

Sendziak, of Warsaw, is one of the strongest apostles of the connection between adenoids and deaf-mutism, and has described three cures due to their removal. He further lays down that in all cases of deaf-mutism a search should be carefully made for adenoids, and when they are found, that their removal is a matter of the greatest moment, as one is at present quite unable to prognosticate which case will improve, and which will remain unrelieved. Lake describes the case of a child, in whom scarlet fever at an early age had left not the slightest trace of hearing power, nor was the patient able to utter a sound. Adenoids were removed, and the mother instructed in the rudiments of the method of Urbantschitsch. The child was able to speak in three months, and did so well in six months.

I myself have published two cases in which marked improvement followed the operation for adenoids. These I reproduce here:—

E. R., aged three years, had never yet learned to speak. When first seen at the Royal Ear Hospital, on May 26th, 1897, his parents stated that they had for some time past noticed that he was deaf. Both tympanic membranes were considerably retracted, and on palpation, a large pad of adenoids was evident. They were removed under chloroform on June 29th. By

August 4th it was noticed that the child was brighter and paying more attention, although he had as yet not learned to articulate words. By September 15th he could say four words, and from that time forwards he progressed steadily but slowly. Politzerisation was employed on every occasion that he visited the hospital, but treatment was, unfortunately, interrupted by a street accident, in which he sustained a fracture of the thigh, and it was not until March 8th, 1899, that he again attended the hospital. He had much improved during that time, and by October 25th could hear well, was observant, and had learned many new words.

I. S., aged five years, was first seen at the Royal Ear Hospital on November 1st, 1899. She had been attending the out-patient department of a well-known children's hospital for four years, under treatment for sporadic cretinism, and was taking five grains of thyroid extract daily. Judging by photographs, this treatment had greatly improved the general disease. She was, however, very deaf, and had never spoken for the first four and a half years of her life. During the six months previous to her coming under my notice she had learned three words. On examination she was found to have a large pad of adenoids, entirely filling the post-nasal space, and her tonsils were sufficiently hypertrophied to meet across the fauces. On November 21st the child was anæsthetised, and the tonsils removed. She so nearly succumbed to the chloroform, however, that further operation was abandoned, and the adenoids were thoroughly removed the following day without an anæsthetic. On December 6th she was already improved, and had learned two new words. By January 1st, 1900, she could hear fairly well, and was able to talk a little. In another month the mother volunteered that the child learned on an average five new words a day, and was in the habit of repeating them to herself in her cot before going to sleep. She continued to take five grains of thyroid daily throughout the treatment.

The following case has also been previously published by me, and I reproduce it here as an interesting and instructive example of how the condition of acquired deaf-mutism may become established:—

H. P., aged two and a half years, was a healthy child until eight months previous to consultation, when he was attacked with "influenza." He began to talk at the age of eighteen months, and made rapid progress. The illness left him deaf, and he began to lose what speech he had acquired. There was non-suppurative inflammation of both tympana, and the naso-pharynx was occupied by a large pad of adenoids. These were thoroughly cleared out, under chloroform, by the Delstanche and Gottstein curettes. He rapidly regained his hearing when the patency of the Eustachian tubes was re-established, and as speedily regained speech.

It is, of course, in acquired deaf-mutism that adenoids play so important a rôle. It must be remembered that the removal of adenoids can only give relief to those deaf-mutes who possess in reality good ears, which, by the presence of the adenoid growths, are inactive. Their removal then not only benefits the aural condition, but, by improving nasal respiration, gives better physical health, and, consequently, better cerebration.

In a paper on the importance of removing adenoids in acquired deaf-mutism, I put forward the following conclusions as a justification for advocating the extirpation of the growths in every case of deaf-mutism:—

1. In cases of acquired deaf-mutism, due to deafness from primary ear diseases, their removal, even if it does not appreciably benefit the aural condition, places the patient in a more advantageous position for further treatment. In many cases where the hearing is in abeyance from disease depending on the adenoids—*e.g*, in children who are very deaf from chronic non-suppurative middle ear disease, and are, consequently, whether the result is contributed to by wanton parental neglect or no, unable to learn to talk, the removal of the adenoids will mean the removal of the obstacle to education.

2. In cases in which, from serious and severe exanthematous panotitis, or in those cases in which the labyrinth is impaired or destroyed from acute infectious disease, without much implication of the tympanic cavity and its contents, the removal of adenoids (if present) will, by improving the general health, the nasal respiration, and, consequently, the cerebration of the patient, place him in a far better position for education by lip-reading than if the growths were allowed to remain.

3. In cases of congenital deaf-mutism, due to developmental errors, either central, peripheral, or of the connecting structures, the removal of adenoids (when present) should be advocated for the reasons given in the second conclusion.

In support of my contention I would cite further a case published by Lockhart Gibson. The patient was a girl, aged nineteen, who was an inmate of the Brisbane Blind, Deaf, and Dumb Institute for six years. She could hear as a baby, and had begun to talk a little before contracting measles at the age of eighteen months. Since that time she had not talked until taught lip-reading. Although she could hear very loud sounds close to the ear, she was, for all practical purposes, deaf and dumb. She breathed heavily, as if with a cold. Both membranes were very opaque and indrawn. The tuning fork was heard well by bone conduction, and, if loudly sounded, by air conduction. There was a dense band of hypertrophy in each fossa of Rosenmüller, and between these bands and a central soft roof mass of adenoids, there was a sulcus. These adenoids were removed, and the ears regularly inflated. She quickly began to improve, and was soon able to hear when she was called from one room to another. The same writer had a similarly successful case in a girl aged fifteen.

5. *Reflex Symptoms.*—Certain symptoms which might well be included in this group have been already mentioned, as reflex cough, laryngismus stridulus, and asthma, which were included, for the sake of convenience, among the symptoms due to the effects upon the respiratory system. Other reflex symptoms, which need not detain us here, are such a common one as grinding the teeth, or such an uncommon one as that mentioned by Bryson Delavan, viz., masturbation.

There are, however, some reflexes which appear to be due to adenoids, and which are of considerable importance, these will be considered here, commencing with—

Enuresis.—This troublesome symptom, especially when nocturnal, is fairly common in adenoid children, and is mentioned by most authorities. M'Bride and Turner, though they have noted the condition, have no records bearing upon the relation of cause and effect between the two. They suspect that when it occurs it may be due to either deficient oxygenation or to a form of night-terror, and consider that, in any case, it is probably connected with the impeded nasal respiration. Gronbeck reported on this subject in 1895, and again in 1898. His work is based on 235 cases of adenoids. Of these thirty-five, or 15 per cent., had nocturnal enuresis. Four stopped spontaneously. Of the remaining thirty, results were obtained in twenty-three only, and after an interval of one-and-a-half years succeeding the operation. Seventeen were completely cured, one considerably improved—the enuresis returning when he caught cold—and in the other two there was no improvement. It would be interesting to possess details of the last two cases, especially as to the presence of other nasal conditions likely to cause obstruction to nasal breathing. The case in which the symptom returned with a cold bears strongly in favour of the remark just referred to by M'Bride and Turner.

Freyberger, in an exhaustive paper on the subject, arrived at the following conclusions: (1) In 350 cases of enlarged tonsils enuresis was present in 104; (2) but only 157 out of these 350 were pure tonsil cases—the remaining 193 were complicated in some form or other. (3) Of the uncomplicated cases (157), only twenty-six had enuresis, while the other (193) cases enuresis was found not less than 78 times. (4) In "complicated" cases of enlarged tonsils and adenoids, "enuresis occured at the rate of round 40 per cent., in uncomplicated cases at the rate of round 16 per cent."

In my own 307 cases analysed I only found three marked instances, but I have since had reason to believe that there may have been more, for in recent cases the symptom has been much more frequent. The three cases referred to were one male and two females. The first of these was a boy of seven years, with deafness in both ears and discharge from the right. He was a mouth-breather, had frequent colds, and suffered from night-terrors. The result of operation as regards the enuresis is not mentioned in the notes. The second was a girl aged ten years, suffering from deafness, frequent sore throats, and enlarged tonsils. The enuresis ceased fourteen days after operation. The third was a girl aged six years. She had deafness, with discharge from both ears, tinnitus (which frightened her), night-terrors (marked), and was a pronounced mouth-breather. The enuresis ceased fourteen days after the operation. The dependence of the enuresis upon the adenoids is strikingly suggested by the last two cases, as it ceased in fourteen days, which is about the time taken for complete healing of the naso-pharynx.

Epileptiform attacks have been noted by several observers, but I personally have not met with them in any case of adenoids. Arrowsmith mentions a patient, an epileptic, who fell in a typical seizure on digital examination of the naso-pharynx, which was filled with adenoid growth.

Francis gives an extremely interesting description of four cases of epilepsy in children, all entirely and promptly cured by the removal of adenoids. One of the patients, a boy, had thirty attacks in twenty-four hours, losing consciousness during the fits, and biting his tongue. Examination with the finger in the post-nasal space brought the adenoids to light, and at the same time resulted in the worst fit he had been known to experience. The number and severity of the attacks were greatly lessened immediately on the removal of the growths, and they ceased permanently three weeks after the operation. The other three cases exhibited symptoms of *petit mal*, severe in character, and were all relieved by operation.

I have met with one case in which infantile convulsions were brought about by the presence of adenoids, ceasing after their removal. (See also the remarks concerning laryngismus stridulus on page 54.)

It has been said that adenoids have caused attacks of *chorea*, but I have never seen that disease in connection with them, nor do I know of any recorded case in which the removal of the growths was the direct means of curing the chorea. I therefore will say nothing further in this regard, save that I have known the operation for adenoids to be the starting point for chorea when done in the German fashion without anæsthetic. In Germany, Austria, and other continental countries, it is customary in some clinics to remove adenoids with the child held in the vice-like grip of an assistant, no anæsthetic being administered or, indeed, thought of. The fright and suffering undergone by a sensitive, delicate child by this procedure can be well imagined, and is, and has been, quite sufficient to determine an attack of chorea. To my mind, such a proceeding, in these days of safe anæsthetics, is totally unjustifiable, and cannot be too severely condemned. Waterhouse has twice seen chorea develope after an operation without anæsthesia.

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CHAPTER V.

DIAGNOSIS AND PROGNOSIS.

There is not a great deal to be said upon the subjects of Diagnosis and Prognosis, but this work would be incomplete without some remarks upon the former, and it is highly important to place before the reader the latter in order to assist him in the avoidance of the extreme school of those who protest against surgical interference with the growths.

There are two methods of examination and diagnosis which are generally practiced, although numerous skilled rhinologists often diagnose obvious cases from the history and aspect of the patient. Still, one may occasionally be led into error—though not often—by doing so. The two methods are those of posterior rhinoscopy and digital examination.

Posterior Rhinoscopy.—There is no need to explain the way in which this is done, it is described in all the text-books but no amount of written description can take the place of frequent practice. There are numerous forms of posterior rhinoscopes upon the market, with and without moveable mirrors, but many rhinologists find the smallest laryngoscopic mirrors (¾ inch) satisfactory in all respects. Some authorities (especially general surgeons) condemn posterior rhinoscopy as useless in most cases, and always so in children below six years of age. It is, however, a method which I endeavour to employ on every possible occasion, and I am pleased to say with a majority of success. A little time spent in trying to gain the confidence of a child patient, and in coaxing him to allow of the use of this method of examination, will nearly always be amply repaid. Older children do not easily forget or forgive the violent thrusting of a finger behind the soft plate, and when the *rationale* of posterior rhinoscopy is explained to them will always help willingly, at least, that is my experience in most cases.

When this method is carried out successfully, the adenoid mass can be seen as a pale, pinkish cushion, marked more or less with the ridges and furrows described in the chapter dealing with its pathology. Various fancy portraits of these growths, as seen on posterior rhinoscopy, are to be found in text-books. They are generally represented as appearing like the surface of a hydatid mole, and although I have searched every text-book that I could obtain I have never once found them represented as they really appear.

At times they show the form which we know so well from the masses removed by a cradelled curette, at others they resemble pendulous masses, or a more or less smooth cushion. Very frequently they are obscured by mucus. In well-marked cases, the hypertrophy is so large that the post-nasal space is practically obliterated thereby. Sometimes the hypertrophy appears to be, as it were, packed away between the Eustachian cushions, and often there is a prominence in the centre between the openings of the tubes.

In adults, whose naso-pharyngeal spaces are so much more roomy than in children, remains of adenoids, when not obscured by mucus, appear as an elevation, or a flattish cushion occupying the roof and posterior wall of the naso-pharynx, and presenting the median cleft, with the remaining sulci more or less marked. By posterior rhinoscopy it will be found that the appearance of adenoids in adults is very deceptive as regards size, a fact due to the larger capacity of the post-nasal space after puberty. I have repeatedly found that what has seemed to be and has been noted as small remains of adenoids, amounting in my estimation to a small pad, has, on removal, proved a large mass.

In colour adenoids usually appear to be pinkish, often very pale; sometimes, however, I have noted them more red, and occasionally almost purplish.

A very characteristic appearance to an experienced observer is often found in the pharynx of the adenoid subject, and is in itself, in my experience, a very sure indication of the presence of pharyngeal tonsillar hypertrophy. This is the presence on the posterior pharyngeal wall of lymphoid nodules of considerable size, often as large as a split pea. These nodules are pale, smooth, and quite distinct in their aspect from the granules of granular pharyngitis.

At times the adenoid mass can be made out by means of anterior rhinoscopy, but this method is not much to be depended upon for purposes of diagnosis.

Digital Examination.—The second method of diagnosis is that of palpation. This method is distinctly unpleasant to the patient, and, in my opinion, is needless when the post-nasal mirror gives sufficient evidence for our purpose. The way in which the finger is used in the naso-pharynx differs with different surgeons. Some rhinologists prefer the following:—The patient is made to open the mouth and lean the head forward, and the index finger is then rapidly passed along the under surface of the soft palate, and up into the post-nasal space. By this method the examiner sits in front of his patient.

Another method is carried out as follows:—The patient is seated, and the surgeon stands behind him or on his right. Passing the left arm round the patient's neck, he props the mouth open with his left thumb, protected by a fold of towel or lint to prevent being bitten. A gag, of the pattern designed by Politzer, can be used for the same purpose. The right forefinger is then passed rapidly into the post-nasal space. When present, the adenoid mass can by this means be thoroughly examined, and will be found varying from a small mass to a large growth filling the space and, perhaps, pushing forward the soft palate. Very often the finger will be found stained with blood after the examination, especially when the adenoids are soft and friable.

To the finger, adenoids usually give the sensation of a softish, corrugated mass, a condition which, in early life, cannot be mistaken for any other abnormal growth. I may say at once that I have never yet experienced the sensation, often described and repeated in the text-books, of a " bag of worms."

When adenoids are found, the surgeon should never omit to make a further examination of the nose and larynx.

Differential Diagnosis.—The only other pathological conditions from which adenoids may have to be distinguished are fibrous tumours, sarcoma, and hereditary syphilitic granuloma.

Fibrous tumours will be more sharply defined on examination with the mirror, and are much more hard and unyielding to the palpating finger. Nor do they bleed so readily as do adenoids.

Sarcoma of the naso-pharynx is not common in adults, less so in children. To the finger it feels not unlike an adenoid mass, but there is not the same sensation of regular ridges and furrows. The liability of sarcoma to frequent and copious hæmorrhage is a distinguishing point of some importance.

Two very interesting cases have been recorded by Garel, in which adenoids were simulated by *hereditary syphilis.* The patients were aged ten and fifteen respectively, and the condition found in the post-nasal space is described as indistinguishable from adenoids. Only one case underwent operation, which was followed by perforation of the palate. The same characteristic lesion occurred two months after consultation in the other case, in which operation was not performed on account of heart disease.

A paper which is useful from the point of view of differential diagnosis has recently been published by Wyatt Wingrave. Excluding the forms of nasal obstruction, readily recognised by anterior rhinoscopy, this writer gives the following conditions as likely to stimulate adenoids:—1. Diminutive choanæ and nostrils. 2. Low vault of naso-pharynx. 3. Paresis of soft palate and pharynx. 4. Vomerine crest. 5. Distortion of vertebral column. 6. Retropharyngeal abscess. 7. Hypertrophy of the palate tuberosities. 8. Webs and neoplasms. Since the existence and nature of adenoids is becoming yearly more recognised by the layman, it behoves the surgeon to be on the watch for all conditions from which error may arise, especially in cases brought to him in whom adenoids are suspected by the parents.

PROGNOSIS.

It may be said at once that the general prognosis of adenoids is excellent, as the symptoms of obstruction can be at once cured by thorough removal, always provided that no other cause for nasal obstruction is present as well. There are, however, other factors in prognosis which require discussion, such as the effect of prolonged habit, the effects as regards the ears, and those regarding adenoids in adults. The important question of recurrence I prefer to leave until that of treatment has received attention.

When mouth-breathing has existed for some time, it becomes established as a habit, and therefore the normal one of nasal respiration may take some considerable time to acquire. This can often only be overcome by careful teaching. Similarly, adenoid speech may remain for some period, and this has to be combatted by similar means. The presence of a large mass of adenoids tends to make the palatal muscles ill-developed and deficient in tone, a condition which requires time to be recovered from.

Frankel reported in "Arch. f. Laryng." two cases wherein mouth-breathing persisted after operation, owing to the fact that the lips could not be closed on account of a short labial frænum after the section of which mouth-breathing ceased.

Crowley has given statistics of his operation cases, which are interesting from the point of view of prognosis. He divides them into four groups:—

1. Quite successful.
2. Practically successful.
3. Improvement only.
4. No improvement.

In the first class there were 143 cases out of 200. In them the improvement in the general health was marked, and the symptoms due to the growths were completely relieved. He remarks upon the establishment of the habit of mouth-breathing and the necessity of care to meet it.

In his second group there were twenty-three cases. In all the improvement was very marked indeed, but some one symptom remained in slight degree, such as snoring, nasal discharge, and ear discharge or deafness.

In the third class, in which "improvement only" took place, there were twenty-five. Of these four cases were not seen, and in ten the continuance of symptoms depended upon enlarged tonsils, otitis media, or hypertrophic rhinitis.

There were only eight cases in which there was no improvement.

These statistics, however, are quite sufficient to show that a good result may be reasonably expected provided the offending growths are perfectly removed. It will be as well to discuss, before going any further, the prognosis of adenoids if not removed. It is not easy to speak with absolute certainty upon this matter, since it depends very largely upon the amount of obstruction to nasal-breathing present. If this be small, the growths may persist for years without giving rise to bad results, and it must be frankly admitted that a fair amount of hypertrophy may exist without producing serious symptoms. At the same time it must be kept well in mind that because adenoids are giving no trouble that is no reason against the possibility that they may at any time do so. I have already pointed out that although symptoms may date from an attack of scarlet fever, or some other exanthemn, this does not mean that the adenoids were not there before. Adenoids when they exist are potent for harm, although they may not yet have had the opportunity of working it. It is this fact that makes delay fraught with danger, and happily this danger is becoming more and more recognised, not only by the profession but by parents. It is not uncommon now-a-days to have adenoid children brought for consultation who have not yet suffered from any untoward symptoms, but whose parents recognise the fact that they may produce trouble later, and have therefore wisely determined to forestall the growths by having them extirpated. When we come to review the many diverse symptoms and complications which may be the outcome of hypertrophy of the pharyngeal tonsil, we cannot but see that there is little reason or justification in allowing them to remain. It is far better to prevent disease than to wait for it to occur before thinking of treatment. The perusal of the last chapter will have given some idea of the evils to which adenoids may give rise; their effect upon nasal respiration, upon the general health, and above all upon the organ of hearing, as well as the various pulmonary conditions that they may induce are all cogent reasons for removing them, and these reasons are amply strengthened by the simplicity of the operation and the minimum risk that it presents.

Little more need be said. The first question asked by those in charge of the patient is usually directed to the immediate risk of operation; this question will be discussed in the following chapter. It remains to speak upon the spontaneous disappearance of adenoids, upon the prognosis as regards the ears, and upon that in adults.

The pharyngeal tonsil atrophies about the fifteenth or sixteenth year, but when it has been the seat of chronic enlargement it is doubtful whether this ever takes place completely; indeed cases have been reported as developing adenoids at an adult age.* Cases have been recorded in which patients have presented themselves with the post-nasal space blocked by adenoids, and on re-examination after some time has elapsed have been found to be practically free from them, but these instances are isolated ones and cannot be taken as of common occurrence. It is certain, however, that adenoids do tend to atrophy, and disappear in later life, but it cannot be too firmly impressed upon the memory that, although this may be and is the case, the effects to which they have given rise remain permanently—the patient may outgrow the adenoids, but the effects may equally outgrow the patient. It is thus that the folly of persuading parents to let their children "grow out" of their adenoids is so patent. Nor is it by any means universally true that adenoids do disappear after puberty. I have met with a considerable number of cases (and other rhinologists have had similar experience) in which I have had to remove masses of large size from the naso-pharynges of adults, and from adults who have advanced years beyond puberty. I have pointed out that in many cases cessation of symptoms, or rather, their amelioration, is more the result of increased capacity of the post-nasal space than of atrophy of the growth.

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* *Vide* Chapter II., Page 14.

One important point to which I would direct attention, is that adenoid remains will at times swell up, and only become patent during an attack of catarrh. This is sometimes most misleading, and may be the cause of misunderstanding and difference of opinion. An attack of adenoiditis, too, will make adenoid remains much more distinct, the growths apparently disappearing when it subsides.

The prognosis as regards ear symptoms varies with the aural lesion present. In suppurative cases it will frequently be found that no treatment will have any effect until the naso-pharynx has been cleared. To those who know anything of the havoc wrought by neglected middle ear suppuration, the advisability of removing adenoids in such cases cannot require a second thought. Unfortunately, cases are not seldom met with in which suppuration has been neglected, and the causative factor not removed, and although, when seen, the suppuration has ceased, so much destruction and cicatricial contraction has been the result that the ear has become almost if not quite useless. In adults the subject of adenoids and middle ear suppuration, there can be no two opinions as to the advantage of removing the growth. This I have pointed out elsewhere already, and to the cases which I have published, I would add the following, reported by Fayette Ewing, which shows in a very striking manner the benefit accruing from the removal of adenoids in the adult. The case was that of a German-American woman, aged thirty-four. She had almost complete nasal obstruction, and her ears discharged very offensive pus. The watch was only heard on contact, she had the characteristic adenoid face, with a listless "woe-begone" expression, and her voice was wholly destitute of resonance. The ear discharge had lasted for twenty years, and was so free that it trickled down her neck, and made her sick with its offensive odour. She was becoming incapacitated for work, was losing flesh, had constant headache and fulness in the head, with pain in the eyes. She could not sleep, and when she dozed was tormented by bad dreams. She had begun to be solitary, and to disassociate herself from her husband and friends, and was becoming the victim of chronic melancholia. Her whole post-nasal chamber was completely blocked by adenoids. Ewing removed the growths, with the result that the ear discharge diminished, and ceased one week after the commencement of local treatment. Her report is best given in her own words:—"I sleep at night and wake up refreshed, my bad dreams, headache and dizziness have disappeared. I breathe perfectly through my nose, and my low spirits have left me. My neighbours, with whom I now associate, declare that I hear much better; my health and strength are returning, and, altogether, I am a happy woman again."

Some physicians appear to think that the removal of adenoids in the adult is a useless and unjustifiable proceeding, but I am happy to say that I have usually found that its results have been all that can be desired, and have, in many cases, surpassed expectation, and I am firmly of opinion that it is as important to remove them when they are causing symptoms as it is in the child. Of course I do not wish it to be inferred that I mean, in thus speaking, that because adenoid remains may be found in an adult they are to be made the opportunity for an operation, I merely wish to emphasise the fact that their presence is not given sufficient importance in many cases of ear lesion. Nor do I speak solely of cases of middle ear suppuration. Only recently have I seen a case in which no improvement in a non-suppurative middle ear disease could be obtained until the remains of adenoids present were removed; the tendency to repeated catarrh which they induced being fatal to any other form of treatment.

Speaking now more especially as to prognosis in cases of deafness without discharge, the question is largely one of duration. Where the symptoms point to the malady having reached the cicatricial stage, or in cases of true sclerosis, the prognosis is not hopeful, but in those instances in which the hearing is becoming worse with each fresh cold, and the colds are due to the presence of adenoid remains in adults, there is, I think, always some hope that their removal may at least bring about some amelioration. For instance, in one lady, aged thirty-four years, who has been deaf from colds for many years, and who could only hear the acoumeter 3½ inches with the right and on contact with the left ear, the removal of adenoids reduced the catarrhs, and subsequent treatment improved her hearing to 37 inches for the right and three for the left ear. Similarly, the fact that the patient's one working ear is becoming affected is ample justification for the removal of adenoid remains.

In children who are deaf without discharge, removal of adenoids is an absolute necessity, but it must never be forgotten that subsequent treatment is equally important, in short, one must not neglect to treat the effects as well as to remove the cause.

One fact I have noted, and I find myself corroborated by M'Bride and Turner, and that is, that in children suffering from non-suppurative otitis media, when the membrana tympani has assumed an appearance which can be best likened to ground glass, especially when accompanied with a permanent pinkish tinge, the prognosis as to improvement by subsequent treatment is not good, sometimes positively bad. In dealing with such cases, therefore, it is necessary to be guarded in giving an opinion as to the ultimate recovery of hearing.

With regard to adenoids in adults, the prognosis in no wise differs from that in the case of children; when they are giving rise to definite symptoms, they require removal equally as much, and the operation is in no way more serious.

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CHAPTER VI.

TREATMENT.

It might reasonably be supposed that there could be no possible question as to the proper treatment of adenoids; this is, however, far from being the case. Although the balance of opinion is very largely on the side of complete removal, there is a section of the profession by whom the propriety of operation is questioned, and by whom complete and thorough clearance of the naso-pharynx is regarded with disfavour. Consequently the number of different treatments which have been suggested is large, and it will be my task to enter into these, and to point out the merits and demerits of each.

Similarly the number of operations which have been devised is very great, and legions of instruments have been invented solely for the purpose of dealing with pharyngeal lymphoid hypertrophy. Indeed, just as it seems that no physician can become an expert obstetrician without inventing a new modification in forceps, so it would appear that no man can become a good rhinologist without designing a new form of forceps, curette, or artificial nail for the removal of adenoids.

No doubt a reaction set in against too frequent and unnecessary operation, probably owing to the fact that the naso-pharynx has often been scraped simply because some lymphoid tissue was felt in its normal position in the vault. But, however much such practice is to be deprecated, the abuse of operation should on no account be allowed to prejudice surgical procedure in cases eminently suited thereto. Had the early mortality of ovariotomy led to the abandonment of that operation, many valuable lives now annually saved by its performance would have been irretreivably lost.

Personally, considering the minimum risk of the operation, and the benefits accruing therefrom, I am strongly of opinion that when adenoids lead to symptoms there can be but one method of dealing with them satisfactorily, and that is by total and complete removal. I am not one of those who would advocate operation in every case where the amount of growth is small and giving rise to no trouble, but in children I think that in many cases of doubt it is better to operate than to leave them alone, for the high percentage of ear complications, and their bearing upon the whole future career of the patient, is so grave that one is justified in incurring the small risk of the operation rather than to throw away the possibility of preventing possible deafness and suppuration. If an operation is not considered advisable, the parents should be put into possession of the facts of the case, and warned to watch the child closely, so that it can be submitted to surgical treatment as soon as the ears become affected, or there appears to be an increasing tendency to the catching of colds.

The treatment of adenoids may, therefore, be divided into two groups, the *palliative* or non-operative, and the *radical* or operative. Both of these require careful discussion in detail.

1. *Palliative or non-operative treatment.*—I cannot say that the palliative methods of treatment which have at different times been suggested or devised have been rewarded with much success in my hands; indeed, they are, it may be safely said, practically obsolete, save among a small section of old-fashioned practitioners. My experience, too, seems to be shared by most other surgeons. Waterhouse remarks: "The former (palliative treatment) has, in my hands, yielded results of comparatively trivial value; the latter (operative treatment) has proved curative in almost every case, and has given me more satisfaction than almost any other surgical procedure." Bryson Delavan mentions local applications merely to condemn them. Both these surgeons speak from the high ground of large experience. Non-operative treatment must, however, be described, because it still numbers a few partisans.

The topical applications which have been suggested are for use in slight cases. When there is but very little obstruction to nasal respiration, and when there is reason to believe that the chronic inflammatory condition and vascularity of the growth can be sufficiently reduced to restore normal nasal breathing, local treatment may be tried to achieve this end. This consists of gently syringing or spraying along the inferior meatus of the nose with some dilute saline solution at the body temperature. Solutions which have been suggested for this purpose are:—

℞	Potassii chloratis	gr. vj.
	Aquæ	℥j.

℞	Sodii bicarbonatis	gr. v.
	Sodii biboratis	gr. v.
	Acidi carbolici cryst.	gr. j.
	Glycerini	♏xx.
	Aquam ad	℥j.

Other solutions containing astringent remedies have also been recommended, of which the following are specimens, the first being the well-known one suggested by Urban Pritchard:—

℞	Glycerini acidi tannici	ʒiij.
	Aquam ad	℥iij.

S. One teaspoonful to a wineglassful of water to be injected down the nose night and morning.

℞	Acid tannic	gr. xv.
	Sod. bibor	gr. xv.
	Acid. carbol.	♏. v.
	Glycerin	ʒjss.
	Aquam ad	℥ij. (Spray)

℞	Eucalyptol	♏. iv.
	Ol. Gaulther	♏ iij.
	Menthol	gr. jss.
	Thymol	gr. v.
	Alcohol rect.	℥j.

S. One part to 7 parts of an aqueous 2 p.c. solution of boric acid to be used to the nose and throat in an atomiser.

The use of such sprays and washes can have no effect when the adenoids are of any size, but occasionally in cases of small and vascular growths, they may reduce them sufficiently to improve nose-breathing. The treatment is certainly simple, and can do no harm if carefully carried out. It must be remembered, however, that such methods are usually much resisted by children, and are therefore likely to be very inefficiently done at home.

Of the application of caustics or the glavano-cautery I cannot say anything from experience, but they seem to me eminently unfitted for use in children, and unscientific and unsurgical in the highest degree.

Should the use of sprays, washes, caustics, etc., be decided upon in any given case, they must be carried out with care and regularity, and should always be accompanied by constitutional treatment, such as plenty of fresh air, residence at the sea-side, good food and exercise, and the administration of such tonics as the syrup of the iodide of iron.

There is one other method of palliation which requires consideration, suggested and practised as it is by a surgeon of eminence and experience. I allude to Arbuthnot Lane's method of respiratory exercises. In his paper that surgeon emphasises (and rightly too) that "the mere partial removal of this inflamed adenoid material alone is an imperfect and unscientific treatment, since it deals only with an effect, and not with the primary source of infection." He considers that treatment is not complete if the removal is not followed by the systematic treatment of the imperfect development of the naso-pharynx. When the pharyngeal tonsil is enlarged, the forced draught through the naso-pharynx, upon which its normal development depends, is in abeyance. The respiratory capacity can be improved by regular breathing exercises, which ensure the passage of the whole of the inspired and expired air through the naso-pharynx only. When systematically carried out, breathing exercises meet with complete success. I do not for one moment doubt that this is so, when the exercises are an adjunct to the operation. But Lane places his method before operation, and speaks thereon as follows:—"For a long time I have been obliged to perform this operation on the pharyngeal tonsil, *but very occasionally* in private practice. On the other hand, *I have seen a large number of cases treated without operation with complete success, when patients were informed by well-known authorities that operative interference was absolutely necessary.* I do not wish to convey to you that under no circumstances is the operation necessary or advisable as an adjunct to other treatment. *It is only in a very small proportion of cases it is required* in order to establish a through way or to telescope the duration of treatment."

Although I cannot agree with the argument that any method of exercise treatment can possibly take the place of operation, I shall give here in detail Lane's method of carrying out his respiratory gymnastics. In any given case our duty is to do the best for our patient to the utmost of our ability, and it is, in my experience, so difficult to be sure of the continued efficient carrying out of such exercises at home, even if the parents of many patients can be made to understand them, that it is far preferable to at once remove the adenoids than to trust the case out of our hands. This is especially the case in hospital practice and in boys at school. I have found that one leans upon a very broken reed when one trusts to school authorities to carry out even a very simple treatment over a long period.

The essentials of Lane's respiro-gymnastic treatment are as follows:—

First, the children must be taught to increase their vital capacity by breathing properly and efficiently. The demand on the expenditure of energy should at first be reduced to the minimum which is requisite to fill and empty the chest to its utmost; any exercise of the muscles which does not bear directly in bringing this about must be avoided.

When the children are thus got to breathe freely, they are supplied with a larger quantity of oxygen; they as a whole, and their several tissues as component parts, perform their functions in a more satisfactory manner; their respiratory capacity increases.

These exercises, which ought to take place in as good an air as can be obtained, should be supported by fatty foods.

Secondly, the mouth must be kept shut habitually, and certainly during the respiratory exercises. When this rule is properly observed, and then only, does the air pass freely and forcibly in and out through the naso-pharynx. If the nasal passages are blocked with mucus, they should be cleared by blowing the nose vigorously. Thus the nasal catarrh is removed, the irritation and hypertrophy of the pharyngeal tonsil subside, the lumen of the naso-pharynx increased "with the structures directly dependent on its development from theirs."

The result of this system of gymnastic respiratory exercises will not only be an improvement in the local trouble, but the child obtains energy to spare; it becomes brighter, more active—in short, healthier.

Although Lane trusts to these respiratory exercises in most cases, he does not reject operation altogether, but puts its indications as follows:—

(a) " When the child has been so thoroughly neglected that the child is unable to drive air through the naso-pharynx."

(b) " When for some reason or another, such as considerable difficulty in forcing air through the nose, ear trouble, important school or other engagements, peculiar circumstances, etc.," it is necessary to shorten the process.

(c) " When the child is too young to do what it is told."

These exercises are most valuable *after* operation; but to teach the doctrine that they may take the *place* of operation is most pernicious and mischievous, and one is inclined to wonder whether its advocate is really speaking seriously.

2. *Radical or Operative Treatment.*—So many methods of operation have been devised for the removal of adenoids that it would be impossible to describe them all without enlarging the dimensions of this work to those of an encyclopœdia. I shall therefore content myself with describing the different features of the main types of surgical procedure, and with discussing the indications, accidents, complications, and sequelæ of operations, and endeavouring to indicate the best type to follow. The large and important question of the anæsthetic I have left to be dealt with by Mr. H. Bellamy Gardner in a special chapter.

The first matter for discussion is that of the best time at which to operate, and the chief indications for operation.

Hernet believes that the operation is done far too frequently. Acting on this principle, he operated on only fourteen cases out of 103, but freely admits that there is danger in waiting. He concludes that intervention is necessary in children who present the following symptoms: Retarded or arrested development, persistent headache, inaptitude for study, intense difficulty in breathing, with threatening suffocation, diminution of hearing power due to repeated tympanic catarrh, purulent otitis media, a considerable bulk of adenoids causing constant salivation, and appearance of hebetude. Intervention should be postponed (but the patient kept under observation) when the adenoids are small in amount, where the general development is normal, where headache and aural complications are absent, and where there is only a very slight catarrhal condition of the primary respiratory faculties. I am hardly disposed to consider the whole of this author's reasoning as sound, for the percentage of mishaps from operation is so small in comparison with the number performed that they almost sink into significance. Even if the growths do atrophy at or about the age of puberty, as Hernet points out as an additional reason for not operating, they leave the naso-pharyngeal mucosa in an unhealthy condition, and many cases of post-nasal catarrh met with during adolescence are the result of neglected adenoids.

M'Bride and Turner have discussed the indications for operation at some length. Obviously, they think, if the adenoids be of such a size as to materially interfere with speech and respiration, they should be removed. Middle-ear deafness is a strong indication with one exception, that with symptoms pointing to anchylosis of the stapes. Other important indications which they give are recurrent earache, repeated colds, cervical glandular enlargement (in view of their tendency towards tuberculous infection), and obstinate post-nasal catarrh in adults. They consider that in cases of fœtid discharge from the ear it is advisable to postpone the operation until this symptom has received treatment. They also consider that there can be no doubt that fairly marked adenoids may exist without giving rise to any symptoms of importance, and may entirely disappear.

Walsham thus sums up the chief indications for operation:—

1. Well-marked signs of nasal obstruction, such as mouth-breathing, adenoid expression of countenance, alteration of voice.
2. Deafness or oft-recurring attacks of deafness, the result of middle-ear disease.
3. Continually recurring head colds, or nasal, laryngeal, or bronchial catarrh.
4. Paroxysmal attacks of sneezing, hay-fever, laryngismus, or spasmodic asthma.
5. Defective physical and mental development.
6. Chronic tuberculous enlargement of the cervical glands.

Hagedorn does not advise removal for the prevention of symptoms. In his opinion the proper time for operation is (1) when breathing is not properly carried on through the nostrils; (2) when throat affections are frequently complained of; (3) when the hearing begins to suffer; (4) when nervous symptoms, as spasmodic cough, enuresis, headache, and aprosexia make their appearance. Age he considers no obstacle to operation, and he has been obliged to operate upon children at the breast. He believes that the only contra-indication is the presence of any febrile disease.

Hessler, speaking especially of the removal of adenoids during acute otitis media, advocates operation immediately after the acute symptoms have reached their climax, and while the inflammatory condition still exists in the ear. In mucous catarrh of the middle ear he waits until the inflammatory reaction and exudation has subsided, when the bulging of the membrane has diminished, and the crackling sounds have moderated. In muco-purulent catarrh he proceeds more slowly. In pure acute and sub-acute suppurative otitis, he performs free paracentesis to obtain free drainage, and when the discharge and hyperæmia have diminished, he proceeds with the removal of tonsils and adenoids.

The above opinions give an accurate *resumé* of the indications for operation in cases of adenoids. The chief question seems to turn upon whether they should be removed as a prophylactic measure or not. The reader will probably have gathered from what I have already said the views I hold upon the subject, but before leaving it I think I may be pardoned for repeating them somewhat in the following summary.

I consider that adenoids call for operation whenever they give rise to important symptoms. These I consider to be:—

1. Symptoms arising from nasal obstruction—adenoid face and speech, snoring, respiratory troubles (especially increased tendency to colds, bronchitis, etc.), aprosexia, deficient development.

2. Ear complications, especially recurrent earache, discharge, increasing deafness, and in many cases of deaf-mutism (*quod vide*). The only exception to which I am inclined to give countenance is that mentioned by M'Bride and Turner—viz., sclerosis, in such cases I prefer to be guided by the presence or absence of other symptoms.

3. Reflex disturbances—enuresis, night terrors, laryngismus, asthma, convulsions, epileptiform attacks.

4. Obstinate post-nasal catarrh.

5. Enlargement of the cervical glands.

6. As a prophylactic measure in cases which present no symptoms but are the victims of adenoids in moderate or large amount, or in whom there is a family history of tendency to tubercle.

In cases in which an operation seems to me not indicated, I endeavour to keep the patient under observation, and instruct the parents what symptoms to watch for. I think that when one is likely to lose sight of a case altogether, or when one cannot trust the parents to carry out instructions, it is better to give the patient the benefit of the doubt and operate. Out of the 307 cases so often mentioned in the course of this work, I only advised no operation in four. Of these one was too ill, and died soon after from pulmonary tuberculosis, one showed no symptoms, one was improving by residence at the seaside, and in one the post-nasal space was large and roomy, and the adenoid growth amounted to a mere thickening of the vault, and gave rise to no symptoms.

Having decided upon the indications for operation, it remains to consider the best form of procedure to adopt. In this we are met by a perfect legion of methods, from simple scraping with the finger-nail, to long and elaborate manipulations with forceps and curette. Every man seems to have his own way of doing the operation, and to claim perfection for it. The fact of the matter is that every surgeon prefers his own method, because he acquires, by constant practice, special skill in the performance of that method. Personally, I always use the curette, in the manner to be presently described. By its means I can clear a naso-pharynx quickly and thoroughly, but I believe that were I to attempt to do the same work with Lowenberg's forceps, I should manage it but clumsily. At the present day, every practical surgeon is fully imbued with the necessity of thoroughness in operating for adenoids, and, provided that skill is present in an operation of this kind, the method by which it is effected does not greatly matter.

The various methods which have been suggested may be divided into groups as follows:—

1. The finger-nail.
2. Forceps.
3. Curettes and ring-knives.
4. Wire loops.
5. Adenomatomes.
6. Combinations of the foregoing.

1. The *finger-nail* has had many advocates, and even now can number a few adherents. My earlier operations were performed with the finger-nail alone, but I soon became convinced that this method is wholly inefficient, and can never be relied upon to thoroughly and completely clear out the post-nasal space. The inefficiency of this instrument I have well seen by the number of recurrences which I have met with in patients operated upon by this method in the early days of the treatment of adenoids. Moreover, it is not every surgeon whom nature has endowed with a strong finger-nail, and it requires a strong nail to cut through the growths, and even then the tough fibrous ones are too much for it. Shadle has advocated the use of the finger-nail, trained to a point, and hardened by a few minutes immersion in alcohol. In order, however, to overcome the difficulties placed in the way by natural deficiency, numerous artificial nails have been invented, notably those of Lennox Browne, Dalby, and Haslam. These are of steel and fit over the end of the forefinger.

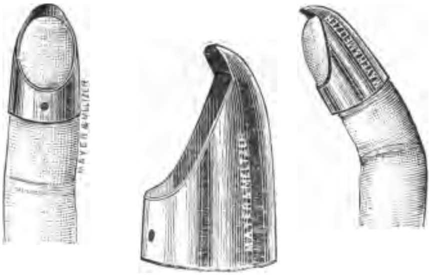

FIG. 19. Dalby's S eel Nail.

Sir William Dalby has ever been one of the warmest supporters of the nail, and recommends the natural finger-nail in children before the age of five or six years, supplemented after that by his steel nail. In exceptionally tough growths, he uses also the curved ring knife. Sir William's method of operation is probably the most typical of the nail procedures, and its description is therefore given here in detail. The nail is of steel

(Fig. 19), and I quote the inventor's own words in description of its use: "There are several considerations which have commended themselves to me in this method of removing adenoid vegetations from the pharynx. In the first place, when the mouth is held open with a Mason's gag, the pharynx can be most completely explored with the forefinger, and the amount of vegetations, their size and position, can be most satisfactorily estimated. The instant after this is done the steel nail can be fixed to the finger, and they can be scraped away at leisure. When I say 'scraped away,' I mean that the steel nail can be embedded in them and made to cut them away. The head being bent forward at the time by the left hand placed upon the vertex, the blood, which flows very freely, escapes by the nostrils It will be observed that the instrument is so made that the tip of the finger is exposed, and this is most useful in estimating by touch what is being done. Although the whole proceeding does not occupy long, inasmuch as it is most unpleasant, and in some degree painful, it is convenient and desirable in many cases, especially in young and timid children, that ether should be given." Sir William Dalby prefers to operate with the patient in a special position, to which I shall again refer when discussing the question of position in operation.

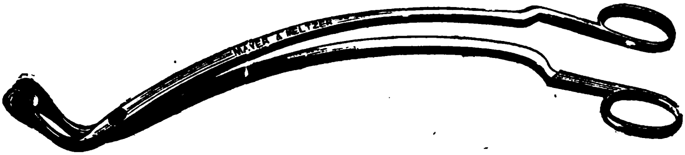

FIG. 20. Lowenberg's Forceps.

2. *Forceps.*—The first forceps invented were, I think, those of Lowenberg (Fig. 20). This pattern has since been modified out of all knowledge. The chief varieties are Woakes', Hovell's, Bowlby's, Macdonald's, Symond's, Michael's, Gottstein's, Jurac's (which has in turn been modified by St. Clair Thomson), Kuhn's, Knight's, French's, Schutz's, and Mackenzie's. To figure or to describe them all would take up more space than would be warranted, and I think sufficient purpose will be served by merely naming them.

Martin, objecting to the curette as leaving a part of the growth hanging, invented a forceps working antero-posteriorly. The anterior cutting blade is modelled on the lines of Gottstein's curette, and cuts against a second blade, which fills in the fenestra.

Forceps have a large number of supporters, and are very universally-used instruments. They are passed behind the soft palate (the patient being anæsthetised), care being taken not to grasp the uvula, and guided by the forefinger of the other hand, made to seize a mass of adenoids. This mass is brought away by a half tearing, half cutting motion, and is then shaken out in a small bowl of antiseptic to free the blades of the forceps of growth. In this way the forceps are rapidly introduced, withdrawn, and cleansed, five or six times, bringing away each time masses of growth. The operation is usually completed by the finger-nail. In using the forceps, care is required not to seize and lacerate the lips of the Eustachian tubes—a mishap which should be avoided by keeping the instrument in the middle line—and not to lay hold of and punch a piece out of the septum nasi.

3. *Curettes and Ring-knives.*—The number of curettes and ring-knives devised for adenoids is almost as great as that of forceps. The best known are those of Gottstein (Fig. 21), Delstanche (Fig. 23), Beekmann, Boecker, Politzer, Bendelak Hewetson, St. Clair Thomson, Mackenzie, Holden, and Golding-Bird, whilst among the ring-knives are Meyer's and Hartmann's.

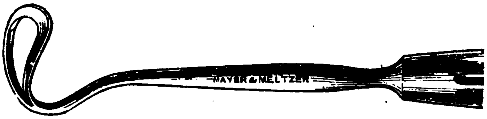

FIG. 21. Gottstein's Curette.

Meyer's original operation was done by means of a ring-knife. This instrument, with a flexible shank, is passed into the pharynx through the nares, its movements throughout being guided by the forefinger of the left hand introduced behind the soft palate. The instrument in question is not much used now, other means of removal being more easy and efficient, but for the sake of the name it bears, and because it may almost be styled the "father of the adenoid instruments," it is shown in Fig. 22.

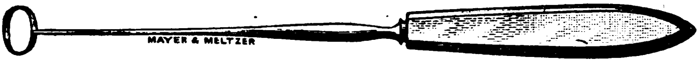

FIG. 22. Meyer's Ring-knife.

As in the case of the forceps, every surgeon seems to prefer to invent an instrument to using those already designed. Hence their large number. Despite this fact, however, I think that the ideal post-nasal curette is yet to be invented, although that of St. Clair Thomson comes somewhere near it. Probably the most useful of them all is that of Gottstein, especially the modification introduced by Delstanche. The instrument should possess the double curve shown in the figure (Fig. 21), *i.e.*, the slight downward curve at the tip of the blade should not be wanting. Delstanche's modification (Fig. 23) has attached to it a cradel, in the forepart of which are two small hooks, which engage the growth and enable it to be brought away in the cage.

This makes a very clean sweep of the central mass, bringing it away intact.

So far, no curette has been devised which will exactly fit the naso-pharynx, or reach it in every part. Munger contrived one on the pattern of Gottstein's instrument, but with a heart-shaped end so that it would enter the choanæ, and so make sure of any growth extending into that region. Unfortunately, the cutting part of this weapon is only at the indent of the heart, and therefore the instrument merely cuts a furrow in the pharyngeal wall.

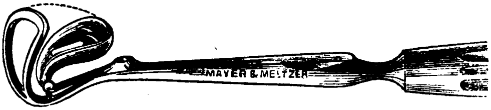

FIG. 23. Delstanche's Curette.

In introducing the cradelled curette or Gottstein's instrument, it is important that the head be well steadied in the middle line. The instrument is at first held like a pen, and its blade introduced behind the soft palate. As the handle is depressed in order to bring the curette against the roof of the pharynx, the hand slips into an overhand position of holding it. The forepart of the blade is made to impinge well against the posterior end of the septum, and then the growth is removed by a vigorous sweep backwards, the handle being raised up towards the forehead in doing so. As the curette is removed it will be found of advantage to place the left forefinger against the soft palate and press backwards and upwards, as this helps to retard the first rush of blood.

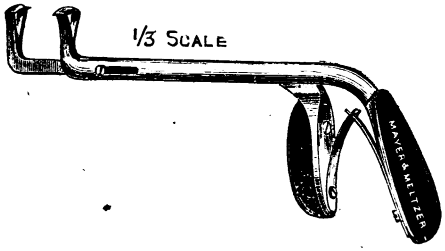

FIG. 24. Major's Adenomatome.

It will be noticed here that I am at present merely indicating the methods of using the different instruments, and not the technique of operations.

4. *Wire-loops.*—The wire snare or loop has been recommended by some surgeons, either in a simple curved cannula, or in an instrument specially devised for the purpose. It has possibilities of usefulness, but it would appear that these have

not yet been realised. In my opinion, it seems absurd to attempt the removal of adenoids by snaring them through the nose, when it is so much easier to effect our purpose with other and more suitable instruments through the mouth.

5. *Adenomatomes.*—These are instruments constructed more or less on the principle of the scissors, and are intended to make a clean incision through the substance of the growth. Their primary object is to remove the whole or as much as possible of the growth at one introduction of the instrument. Most of them are too large, or of too improper a shape, to be introduced into the naso-pharynx, and their strength places any unfortunate object that they may grasp completely at their mercy. Even in the hands of the most experienced operator they are most dangerous. One of them, that designed by Major, is shown in Fig. 24. The construction of the blades of most of them is such that it would be impossible to reach all parts of the post-nasal space with them, and they may easily be made to cut too deeply.

Before passing on to combinations of the foregoing instruments in operations, it will be as well to review briefly their respective merits. I have already spoken at length concerning the finger-nail, but would wish to add that, while it is undoubtedly valuable as a means of completing the work of other instruments, it is useless alone. Gottstein has remarked, "It is clear that with the finger only a very little can be removed, and, moreover, it must be recognised that from the point of view of asepsis the finger-nail is a decidedly undesirable instrument." Save with a very few exceptions, the artificial nail may be said to be practically obsolete.

Ring-knives may be valuable for the removal of small areas of tissue, especially those left after operations with larger instruments, but, if the original operation is done efficiently, such additional manipulations should be unnecessary.

Of all the curettes, that of Gottstein and its modifications enjoy, and deservedly so, the greatest popularity; it has, however, its drawbacks, and unless kept very sharp is liable to cut only half through the growth, leaving it hanging, and necessitating its removal with forceps. In time, no doubt, a properly-shaped modification will be introduced.

Forceps, modified to suit the size of the pharynx and the location of the growth, are of value in skilled hands. By their means masses of growth can be seized and torn away. As the blades can, by a skilled operator, be made to reach every part of the post-nasal space, that cavity can be very efficiently cleared.

As I have said, different surgeons prefer different methods, but there can be no two opinions as to the end to which operation on adenoids should attain. The removal should be as thorough as possible, and should be conducted with the minimum of risk to the patient. With regard to the latter, two points have seriously engaged the attention of specialists, viz., the choice of an anæsthetic and the position of the patient. The former I have left to be discussed from the best point of view, that of the anæsthetist, beyond remarking that, save in very exceptional circumstances, I can see no possible advantage in attempting the operation without anæsthesia or under cocain. Provided the anæsthetic is carefully given by a skilled practitioner, the risk is reduced to a vanishing minimum.

The position of the patient is a point to which great importance has been given by some surgeons. Many prefer to operate with the patient on his back, the head hanging over the table. This is known as the method of Rose, and was introduced in 1874. Others like the operation done with the patient seated in a chair, and others prefer the patient upon his side. I propose to take the remarks of various operators to show the difference in opinion in so apparently simple a matter.

Sir William Dalby places the patient astride of a narrow couch, the body leaning forward at a right angle with the thighs. The patient is etherised first, and then, when ready for operation, is raised into this rectangular position. Thus, blood cannot enter the larynx.

Waterhouse says that in his opinion the safest position is undoubtedly that in which the patient lies upon his back, with the head hanging over the end of the table. "This position of the head somewhat increases the bleeding, but it absolutely prevents blood entering the larynx and bronchi, as to do this it would have to run uphill. In this position the blood runs out of the nose and mouth, carrying with it fragments of the neoplasm."

Rose's position is also recommended by M'Bride and Turner, Crowley, and many others.

French, Menière, and a large number of others prefer to operate in the upright position, whilst some surgeons operate with the patient upon his side. My invariable practice, and that, I believe, of most of my colleagues at the Royal Ear Hospital, is to have the patient lying flat on the back, without a pillow, and with the head kept well in the middle line. As soon as other instruments are discarded for the final clearance with the finger, the patient is turned over by the assistant almost on to his face. By this method I have never experienced any difficulty from the blood going into the air passages, whether the anæsthetic be gas or chloroform.

Menière, who has performed no less than 3,710 operations upon adenoids, dispenses with an anæsthetic. His procedure is as follows: For three or four days before the operation the pharynx is washed out with warm boric acid lotion. When the growth is spread over the whole of the posterior nares, without a central mass, the whole surface is curetted at one sitting; should there be a large central portion, the operation is done in two parts, first for the central portion, and four or five days later, for the lateral parts. He concludes by antiseptic douching, and the application of menthol vaseline introduced through the anterior nares. This method is carried out with the patient in a sitting position.

6. I now pass to what may be called "*combination operations*"—viz., those in which both forceps and curette are used. A very large number of surgeons employ this method, which consists of removing the larger part of the adenoids by forceps, then introducing the curette, and finally finishing with the finger. There is no need to discuss this method, which certainly carries out the object of the operation perfectly. It only remains for me to describe the preparation of the patient, the performance of a typical operation, the after-treatment, and the remote and immediate accidents and complications which may arise.

Preparation of the patient.—It is often advisable to place the patient before operation upon dietetic and hygienic treatment, or to send him to the seaside for a short time. This, with the administration of the syrup of the iodide of iron, and the cleansing of the nose and naso-pharynx with Dobell's solution, or some other simple antiseptic alkaline douche, will often place the child in a more advantageous position for operative treatment.

Often the operation is done under gas in the out-patient room, in which case little preparation is needed beyond the clearing of the bowels the night before and the abstention from solid food for a few hours before operation.

As the operation is attended with considerable bleeding, it is well in private houses to prepare for this by covering the floor, for which purpose the use of old newspapers, suggested by Mr. Edmund Owen, is useful. Children with long hair should have the head covered with a bathing cap or a towel folded turbanwise.

I propose to describe three types of operation, that in which the patient is seated in a chair under gas, or gas and oxygen, the combination operation with forceps, curette, and nail, as described by Walsham, and the curetting operation as usually performed by myself.

The operation under gas.—The patient is anæsthetised sitting in a chair, but the supine position may be adopted if preferred. He faces a strong light, or the operation is conducted by reflected light. When anæsthetised, the dental mouth-prop is changed for a gag, and the mouth is widely opened. Unless he has been previously examined, the left index-finger is introduced behind the soft palate, and the condition of affairs ascertained, not only as regards the adenoids, but also as regards the posterior nares. The curette is then passed into the post-nasal space until it touches the lower part of the nasal septum. It is then pressed upwards and backwards, keeping the blade in contact with the bony septum, until the roof of the naso-pharynx is reached.

The handle of the curette should be kept well in the middle line, and the head steadied by the anæsthetist. Now firmly pressing backwards, the handle of the instrument is sharply raised, the blade swept down over the posterior wall of the naso-pharynx, and the major portion of the growth is cut off in one piece. This curette, with the growth attached, is removed, and a smaller instrument introduced, and three or four rapid sweeps made over the pharyngeal wall. The finger completes the operation. Sometimes, especially when the instrument is not very sharp, the growth is left hanging by a shred of mucous membrane, and requires removing with a pair of forceps. The operator sits or stands facing the patient throughout the operation.

The combination operation.—The following, as described by Walsham, is a typical acount of the operation with forceps and curette. The patient is placed well under the influence of ether, lying on the back, with the shoulders raised, and the head depressed over a small pillow. The surgeon, standing on the patient's right side, introduces a Mason's gag into the mouth, and intrusts it to his assistant. The mouth being widely open, the tonsils, if enlarged, are first removed with a tonsillotome, and the resulting hæmorrhage stopped by sponging. The right forefinger is introduced into the naso-pharynx, and the circumference of the cavity well scraped with the nail, thus removing the smaller growths, and carrying the larger towards the pharyngeal tonsil. Lowenberg's forceps are next passed behind the palate, care being taken to avoid seizing the uvula, and a mass of vegetations seized and brought away in the manner already described above (page 90). The forceps having been thus used five or six times, the forefinger is again introduced into the cavity, and search made for any adenoids that may have been left. Those in Rosenmüller's fossæ are scraped away by means of Meyer's ring knife, passed through the inferior meatus of the nose. A Gottstein's curette is next used, and removes any growth that may remain; lastly, the finger examines again the post-nasal space, and its nail gives a final scrape.

The curette operation, as performed at the Royal Ear Hospital, is done as follows: Gas is used for all but very small children, in whom chloroform anæsthesia is found to be preferable. The patient is placed in the prone position, without a pillow, and the head is kept in the middle line by the anæsthetist. Under gas, the mouth is kept slightly open by means of a dental prop, changed later for a Mason's gag. When tonsils have to be removed as well, the gag is first put in on the right side, and another gag is introduced on the left side before the first is removed. When adenoids only are present, it is introduced on the left side. The mouth being widely opened, a Delstanche's cradeiled curette is introduced, and the main part of the growth is removed. An ordinary Gottstein's instrument is then used to give several sweeps over the naso-pharyngeal wall. When this is discarded, the finger, protected by a rubber guard, is introduced, and the operation thoroughly finished with the nail. As the finger is introduced, the operator says "Over," and the patient is immediately turned almost on to his face. Hæmorrhage is free, but quickly ceases on sponging the face and forehead with cold water.

Asepsis is ensured by boiling the instruments, and placing them in one in forty carbolic solution. Many surgeons use a nasal alkaline wash for several days before operation, and Würdemann considers it a "necessary adjuvant," but in my experience it is unnecessary, although, if properly used, it can do no harm.

When adenoids are accompanied by enlarged tonsils, the latter can be removed separately or at the operation for the former. I generally prefer the latter course. It certainly adds to the bleeding, but I have not found this to be any disadvantage.

In cases of cleft-palate complicated by adenoids, a by no means uncommon occurrence, the general concensus of opinion is in favour of removing the adenoids at a preliminary operation, after which the cleft palate can be more easily closed, and the after treatment better carried out.

There are at least two events which may complicate the operation, these are an abnormal condition of the pharynx and the breaking of the instrument.

Felt has reported the case of a boy, aged eleven years, in whom the "pharyngeal picture was unique." The posterior pillars were free above, but about 1 cm. below their junction with the uvula, both were drawn towards the median line, and converted into scar tissue, due to scarletina, which was continuous with scar tissue on the pharynx proper between the pillars. This scar tissue rendered the curetting of the adenoids which were also present difficult. Bishop reports a somewhat similar case.

The breaking of the curette or other instrument is an accident, which may occur to any surgeon. Holmes and Garlick have recently reported two cases. In both of these the curette broke where the cutting blade begins. In the first case the fragment was extracted by the finger with some difficulty; in the second the fragment was swallowed, and passed without trouble *per anum* three days later. Similar accidents have been reported.

After Treatment.—It is an undoubted fact that much harm may be done by injudicious interference. Hæmorrhage is free, but soon ceases. No attempt should be made to stop the bleeding by syringing with iced water, etc., as has at times been recommended. The application of ice or cold water to the forehead is, however, a valuable agent in stopping hæmorrhage from the post-nasal space, and may be used with impunity. After an operation for adenoids the patient should be placed in bed on his side, and allowed to sleep off the effects of the anæsthetic. Frequently vomiting of blood occurs at intervals of from six to twelve hours. It is due to the blood which has been swallowed, and need cause no alarm. It is, however, wise to warn parents of this possibility, when an operation is done in a private house, or the surgeon may find himself sent for unnecessarily.

The post-nasal space takes, on the average, from ten to fourteen days to heal completely, and, during that time, the patient requires care. For the first one or two days it is best to keep him in bed, and to confine him to the house for the next four days. If the weather be fine he may be allowed out during the remaining part of the time. During confinement to the house it is of importance that the temperature of the room should be kept equable, and that the patient should be guarded against draughts. Provided hands, sponges, and instruments are aseptic, and the naso-pharynx be left to itself after operation, there is no reason to expect any case of adenoids to do other than heal quickly, and without complications. The meddlesome practice of douching or syringing the nose with the idea of keeping the parts antiseptic is, in my opinion, not only useless but distinctly harmful. Cases in which inflammation and suppuration of the middle ear have occurred after operation for adenoids, unless due to laceration of the Eustachian cushions, can be always traced to either douching or syringing, carelessness in getting into draughts, or insanitary surroundings.

As regards the *feeding of the patient*, for the first day he should take nothing but liquid—milk, beef tea, etc., and for the first six hours or so after the operation (whilst there is any vomiting of blood) it is better to only give occasionally a teaspoonful of hot water, or ice to suck. The second two days soft foods (bread and milk, milk puddings, custards, etc.,) may be given, after which the soreness will have passed off sufficiently to allow of more solid food. When the tonsils have been removed as well, the necessity for soft foods is extended over a longer period.

The necessity for careful teaching in nose-breathing, speech, etc., must not be lost sight of, and should be begun as soon as the immediate effects of the operation have passed off. Ear complications also require treatment, and in cases in which inflation is necessary, it is my practice to postpone it until at least a week after the operation.

The question of *complications following operation* on adenoids is a very important one, and must be entered into at length. The possibility of an occasional fatal result is important and requires discussion with a view to prevention. With death due to the anæsthetic I shall have nothing to do, that subject being sufficiently dealt with in the next chapter.

Shurly remarks that serious accidents or sequences are not often heard of, and he has collected a series of them and analysed them. He classifies cases into *Simple* (enlargement or overgrowth simply), and *Complex* (enlargement dense or encapsulated, or accompanied by hypertrophied tonsils, hypertrophy of peritonsillar tissue and possibly of the turbinals). He thus classifies the possible untoward effects of operation:—

Immediate.

1. Hæmorrhage.
2. Injury to the pharynx.
3. Reactionary acute inflammation affecting the pharynx, larynx, tonsils, ear, accessory sinuses; sepsis.

Remote.

1. Sub-acute disease of pharynx.
2. Chronic disease of the ear.
3. Disease of the accessory sinuses.
4. Tuberculosis.

Taking this classification, we will discuss its groups *seriatim*.

Haemorrhage.—This is decidely rare, save in hæmophylics. As regards the latter, deaths have been recorded by Sachs (in a boy aged ten years), Stucky (patient, a boy, aged fifteen years, a hæmophylic, in whom scondary hæmorrhage occurred two hours after the operation), and others. Martin has described three cases of troublesome bleeding after operation in children aged respectively sixteen, seven, and six years (one boy and two girls), in two of which he had to plug the post-nasal space. Other cases have been reported by Hooper, Newcomb, Barkan, Schmiegelow, and Kenefick, all from hæmorrhage, usually secondary, and mostly in "bleeders." Schmiegelow has recorded one case in which death was due to primary hæmorrhage, the internal carotid artery being ruptured close to the base of the skull, the lateral pharyngeal wall having been extensively lacerated.

Thompson, of Cincinnati, has described the case of a lady aged twenty-nine, in whom the left internal carotid passed up behind the posterior pillar of the fauces, quite superficially in the lateral pharyngeal wall, being apparently just beneath the mucous membrane. He draws attention to what might have happened in this case had an operation for adenoids been required in childhood.

Hæmorrhage after adenoid operations has been made the subject of several papers. Cordes has summed up the causes as follows:—

1. General disease, hæmophylia.
2. Cardiac disease, especially hypertrophy of the left ventricle, and arterio-sclerosis. These conditions apply only to adults.
3. Anomalies in the course of the internal carotid. In some cases it exists beneath the posterior pharyngeal wall, on a level with the anterior part of the atlas, a bony crest which, by its prominence, renders the operation difficult in many cases. Hæmorrhage in such anomalous cases is alarming.

4. A preparatory application of cocain may be followed by severe hæmorrhage.

5. Small shreds of vegetations remaining partly attached to the pharynx may give rise to hæmorrhage, which ceases when they are removed.

6. Occasionally severe hæmorrhage results in females if the operation be performed at the time of the menstrual period.

7. In many cases hæmorrhage occurs without assignable cause.

Kimball, speaking from twelve years experience, with a total of 350 operations, has met with no case of serious hæmorrhage, and stigmatises it as a surgical bugaboo." In dealing with all cases of adenoids he emphasises the following points:—

1. Thoroughness of removal and care in technique at the expense of time.

2. Selection of instruments best suited to perform the operation safely and efficiently.

3. Positive exclusion of hæmophylics.

4. Complete supervision of the patient until the danger of hæmorrhage is over.

Wishart endeavoured to use suprarenal capsule to stop the blood flow, but without satisfactory results. Some surgeons have proposed to finish the operation with the galvano-cautery.

In my opinion, the subject has been made too much of. In a total of over 300 operations I have never once met with it in more than ordinary amount or troublesome to stop, and I agree with Kimball that ordinary care as regards technique, supervision, etc., is all that is required. Exceptions must occasionally occur, but they do so in my experience with great rarity.

Injury to the pharynx.—Such an accident as this is due to bad instrumentation. The use of cutting forceps and the employment of too great force are mainly responsible. Such complications are eminently preventible, and should not occur.

Reactionary acute inflammation.—Shurly has met with severe peritonsillitis, facial erysipelas, severe laryngitis, and in two patients there was peritonsillitis associated apparently with gonorrhœa. He avoids operating when influenza, diphtheria, etc., are prevalent. Shurly has also met with one case of fatal septic meningitis. He considers that the danger of tuberculosis following operation is greatly overrated, an opinion in which I cordially agree.

M'Bride and Logan Turner have classified complications of adenoid operations as follows:—

1. Contracting some contagious disease, *e.g.*, scarletina, measles, erysipelas, or diphtheria.

2. Tags of tissue loosened but not detached. These should be removed with a cutting instrument.

3. Stiff neck, a symptom which soon passes off.

4. Ear complications. These are to be avoided by scrupulous

care of hands and instruments, with avoidance of injections of air or fluid for at least a week.

Crowley gives a list of complications from his own experience: Out of 200 operations, nineteen patients suffered some after-complication. One child had acute earache for several days. One child became deaf, and did not recover completely. Six cases had otorrhœa after operation, one child was feverish and delirious for a week, seven cases had stiff neck, one child developed broncho-pneumonia, and one lobar pneumonia. Most of these cases were allowed to go home after the operation, and their complications could be traced to exposure.

I have now performed over 300 operations for adenoids, and am glad to say that I have never been troubled by any complications. I believe that with reasonable care as regards asepsis at the operation and the after-treatment of the patient, the surgeon need have no anxiety as to the well-being of his cases.

Lastly, I have to speak on the interesting subject of *recurrence.* That recurrence does occur at times cannot be doubted, but there are two points to which attention must be drawn. First, we must distinguish between recurrence of adenoids and recurrence of symptoms. The latter may occur and yet the post-nasal space be quite clear of growth. This recurrence of symptoms may be due to:—

1. Continuance of the mouth-breathing habit, regarding which sufficient has been said already.

2. Projection forward of the atlas and axis (suggested by Dundas Grant).

3. Nasal obstruction from other causes. I have already said that it is necessary to examine the nose and correct later any abnormal condition in that region which may complicate matters.

Secondly, we must differentiate between true recurrence and false recurrence, by the latter I mean the growth of tags which have been left by a former imperfect operation. Such cases often occur when the finger-nail only has been used.

False recurrence.—As a good illustration of this, the following case which came under my observation is here related. The patient, a boy of fourteen, was operated upon for adenoids five years ago, after which a chronic suppuration in the left ear cleared up and has not recurred. On examination of the naso-pharynx with the posterior rhinoscope a few tags of growth were noted at the margins of the pharyngeal vault. As there were no symptoms to justify further operation, inaction was advised, and the boy watched. All went well for nearly a year, when he was attacked by scarlet fever. Examined after this illness it was found that he was becoming deaf, and that the tags had greatly enlarged, necessitating removal. This could hardly be called recurrence in the true sense of the word.

Heerman, of Kiel, states that in his experience the removal of adenoids only relieves the symptoms in 60 per cent. of the cases.

In the other 40 per cent. the patients return in a short time with the same symptoms. He finds that when the growths recur there is constantly swelling of the turbinals, which has not subsided on their removal. He prevents recurrence by intranasal treatment. I doubt not that most of the cases described by this author are really those of recurrence of symptoms.

Eliss has written a fairly exhaustive article on this subject, in which he remarks that the non-malignant character of adenoids makes true recurrence hardly to be expected. He found in two of his own cases that at the second operation the tissue was chiefly about the wings of the vomer, and he presents the following conclusions for consideration:—

1. The patients all showed a certain under-development of the entire naso-faucial region. The nares were small. The hard palate in the older cases was Gothic-arched. The naso-pharyngeal space was very narrow, with, as a rule, a low, flat vault, suggesting the horizontal position of the basilar process of the occipital bone common to early infancy. The whole general structure of the naso-faucial area was infantile An exception to this was found in two instances, young adults, where, instead of the horizontal basilar process, the latter ascended sharply in an oblique direction, and appeared to articulate with the sphenoid considerably above the vomero-sphenoidal articulation. In this recess a large amount of adenoid tissue was packed.

2. Another feature of these cases was the excessive vascularity of the growths.

3. In some instances, there were noticed fine friable spicules of bone about the articulation of the vomerine wings and the sphenoid.

4. In each case, the patient's whole aspect corresponded to the condition termed "strumous," an apparent failure in those vital processes which tend to complete development in the body structures and the maintenance of the integrity of tissue.

To avoid recurrence, Bliss advocates very complete removal, especially about the vomero-sphenoidal articulation.

Nearly every case of so-called recurrence which has been recorded seems to have been due to imperfect removal,—what I prefer to call "false recurrence,"— but in rare cases, true recurrence may possibly happen. It is therefore best to always give a somewhat guarded prognosis when questioned upon this point by parents before an operation. The following case, related by Lermoyez, would appear to come into the category of *true recurrence*, and is of undoubtedly extreme rarity. What appeared to be adenoids in a child were twice removed, each removal being very soon followed by recurrence of symptoms. The tissue obtained at the second operation was found to be tuberculous, and not to have the characteristic adenoid structure, while tubercle bacilli and giant cells were abundant.

To sum up the whole subject of recurrence, one can deduce the following:—

1. Recurrence of symptoms is not uncommon.
2. True recurrence of adenoids is rare, but false recurrence owing to imperfect removal is fairly frequent.

The obvious corollaries to these conclusions are:—

1. Further treatment, directed to the cure of habit and to the correction of other nasal abnormalities, is necessary.
2. Every operation for the removal of adenoids should be as complete as possible.

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CHAPTER VII.

THE CHOICE OF THE ANÆSTHETIC.

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The consideration of this branch of the subject must be prefaced in the reader's mind by the predominant fact that the patient's upper air-passages are more or less obstructed to the ingress and egress of air. The presence of obstruction to free respiration varying in degree, but active to some extent in almost all cases of adenoid growths in the post-nasal space, present us with a subject for anæsthesia who differs from the normal, healthy individual in a most important particular.

In view of the very high death-rate which at one time prevailed under the influence of chloroform for the removal of adenoid growths, a theory was advanced and, indeed, obtained some footing that a lymphatic diathesis existed in these patients, which was described as rendering them more prone to circulatory depression under chloroform than those in whom such glandular hypertrophies did not exist. Without expressing a definite opinion upon this question, as the subject is still *sub judice*, we may wisely regard the whole type of adenoid patient with his slower intellect, deafness, congested upper air-passages, oral breathing, muco-purulent secretions, and arrested chest development as one who is distinctly less likely to inhale or eliminate an anæsthetic as satisfactorily as the healthy being.

Two salient features, however, present themselves in the asphyxial factors which are introduced in anæsthesia, and even during normal sleep in the adenoid patient, by the presence of the growth itself and, at an operation, by blood and mucus, added to the intermittent interference with free respiration by the inevitable manipulations of the operator while working in the tidal air-way.

These general considerations, however, should in no way reduce the importance of estimating the individual character and physical type of each patient.

The age of the subject should, of course, make a great difference, not only in the manner in which the anæsthetist should set about his task, children under four or five years being simply told that they are going to breathe a little "sweet air" or "scent," whilst older ones may be instructed to close their eyes because they are going to be "put to sleep for a few minutes," but also even in the anæsthetic itself; the possibility of a long anæsthesia under nitrous oxide and oxygen, for instance, increasing exactly in proportion to the age, size, and development of the patient to be operated upon.

As regards sex, it will generally be found that girls are far more tractable and easily managed than boys, for they appear to give their confidence more completely to their medical attendants, whilst boys seem to entertain a suspicion of being in some way deceived or taken by surprise in an unguarded moment. These therefore require a more frank and candid treatment, and, if over six or seven years of age, it is best to tell them that you are going to speak to them "just as if they were grown-up men," after which it will usually be found that they will listen carefully to instructions and obey them to the letter.

The quantity of anæsthetic required is nearly always greater in males than females to produce a given result; but extra allowance must be made for females of masculine type and build, and *vice versâ*.

Regarding the pathological state apart from the immediate symptoms due to nasal obstruction, the liability to bronchial catarrh in the subject of adenoid growths must be borne in mind, besides the excessive secretion of mucus in the mouth which is apt to occur under any irritating anæsthetic.

The chest, when free from other signs of disease, is often found to be deficient in the power of adequate expansion, and frequently also rickets may complicate the arrested thoracic development alluded to.

Other things being equal, a florid and well-nourished child is likely to take more anæsthetic, secrete more mucus, and to bleed more freely than one of paler countenance and slighter build.

The best time of day for operating upon adenoids is that at which the patient's vitality is approaching the maximum, and at which, in small children, the needful abstinence from solid food will be least noticed and regretted. The hours between 9.0 a.m. and 11.30 a.m. seem to fulfil these conditions best, because no breakfast is required before the earlier time, if that be fixed upon, and only a cup of clear soup is needed at 8.0 a.m. if the operation be timed before noon. The last meal the night before should consist of soft bread and milk, or biscuits soaked in milk, at 6.0 or 7.0 p.m., or whatever meal the child is accustomed to before bedtime, with as little departure as possible from regular habits. Apprehension of an operation will often completely arrest digestion, and six or seven hours after a semi-solid meal, undigested food may be vomited during an operation late in the day. When starved for several hours children are apt to purloin apples or nuts to satisfy their hunger, and it is better to give them soup and toast at noon than to run the risk of such a *contretemps* at an operation in the afternoon. The writer once administered gas and ether to a boy of twelve who was said to have just had his tea. The operation being very urgent, the meal was regarded as unlikely to interfere seriously with the anæsthesia. During recovery, however, the child's upper air passages became entirely blocked with semi-fluid masses of undigested food, and it was with the greatest difficulty that he was kept breathing without recourse to tracheotomy till the vomiting was over. It was then admitted that he had had six large slices of bread and butter at his recent meal.

It is always distinctly of advantage for the parents of the patient not to be present at all during the induction of anæsthesia or the operation, for the child and parent constitute a far more unmanageable combination than any patient with a proper nurse who knows her business.

The question of posture is largely dependent upon the nature of the operation to be performed. If the surgeon desires merely to thoroughly scrape the naso-pharynx, a proceeding only occupying a minute or so of time, the administration of nitrous oxide and oxygen in the sitting position is a perfectly safe and adequate method; it can, however, hardly be advocated in very small children, on account of the very short duration of the unconsciousness it produces. For the more extensive operations, involving the use of a curette and Löwenberg's forceps, the dorsal position is to be recommended, with the head occasionally turned to the side for drainage of blood and débris. For several years the dorsal posture, with the head completely dependent over the end of the table, has been in vogue, with the view of avoiding the danger of foreign matters entering the lower air-passages. It has been found, however, that such extension of the neck produces painful stiffness, and that the prominence of the bodies of the vertebræ within the pharynx renders the scraping of its surface more difficult of performance; the blood, also, which was supposed to drain out through the nose, is very apt to coagulate and block that passage early in the operation. Reliance is better placed upon maintaining a lighter form of anæsthesia, in which the coughing and swallowing reflexes are retained and foreign matters thereby removed from the superior aperture of the larynx. It is well to request the assistance of a third person during the operation to aid in turning the patient on to his side from time to time, but if the surgeon is content to operate with his subject in the lateral posture no such help is required, for drainage will be complete from the lower side of the mouth.

During the operation and for an hour afterwards great care should be taken that large surfaces of the patient be not exposed to the air, for lowered temperature is a fruitful source of depression when added to loss of blood and impending vomiting.

There is no doubt whatever in the writer's mind that a mixture of one part of chloroform and two parts of ether by volume is the golden mean in the list of anæsthetics, and that it constitutes an ideal inhalation for the extirpation of adenoids. This mixture is best administered on a small sponge tucked into a Rendle's celluloid mask (Fig. 25), or for very small children upon a flannel cone; for the colour of the patient's face, his breathing and general circulation will be found to be deeper and more satisfactory than under chloroform alone, and less hampered by the presence of mucus and free bleeding than under the influence of pure ether. When the surgical procedure is likely to be prolonged, a Junker's apparatus may be employed to maintain the narcosis for any required period of time. The usual duration of available anæsthesia after the inhalation of the "C1E2" mixture to that degree where corneal reflex is decidedly sluggish will be about four or five minutes, and this suffices for all but the most methodical procedures.

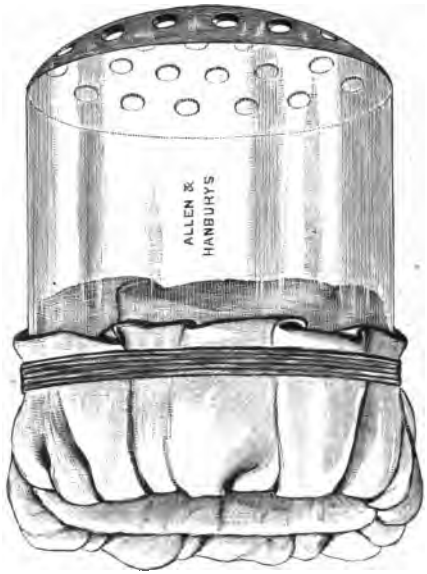

FIG. 25. Rendle's Inhaler.

The exact manner in which to induce anæsthesia will now be described. Three ounces of the mixture should be prepared; half a drachm of the liquid is poured into the sponge of the Rendle's mask, and the patient's head is gently turned to the right side. The mask is now gradually brought to within an inch of the patient's mouth, and he is instructed to blow into it quietly and slowly; the anæsthetist resting his left arm and wrist on the left side of the patient's head now grasps the mask with his left hand and pours small quantities of the mixture from his Thomas's drop bottle through the holes at the outer end of the mask (if these are not large enough they must be enlarged for the purpose).

The whole art of inducing anæsthesia is that of verbally encouraging the patient to breathe regularly until unconsciousness is attained, and advantage should be taken of regular breathing to increase the strength of vapour fairly rapidly from the beginning. This method avoids any possibility of vomiting, and produces the requisite degree of anæsthesia within five minutes. The mixture should be used quite freely, and an ounce and a half of the liquid may be necessary to anæsthetise a boy of twelve years of age. His colour during this time should be a bright pink, his breathing audible and regular, without struggling or any inconvenient movement whatever. When the pupil is of moderate size, the limbs flaccid, and the corneal reflex dulled in activity, the mask is to be removed. A Mason's gag (the blades being padded with indiarubber) is inserted between the patient's teeth on the left side of the mouth, and opened fairly wide for the surgeon to begin. Some operators may require the head to be in the mid-line, with the face to the ceiling, and, if this is done, several sponges, about the size of a small orange should be at hand for cleansing the back of the throat; the anæsthetist may be required to do this, but should not relinquish the gag nor allow his attention to be diverted from the respiration, which must never become obstructed, or even slightly hampered, for more than two breaths at a time throughout the operation. This is very necessary in weakly subjects, because secondary cardiac depression is likely to follow upon a congested state of the venous system. In case of accidents apart from hæmorrhage, which is the surgeon's special care, lowering of the head, drawing forward the tongue, clearing the air-way, and regular compression of the chest (*i.e.*, efficient artificial respiration) will certainly restore patients suffering from temporary circulatory failure or respiratory obstruction. Many drugs have been advocated in such emergencies, but a few whiffs of ether form a more rapidly absorbed stimulant than any hypodermic injection when the vitality is depressed.

There can be little doubt that the administration of an anæsthetic in these cases is fraught with real danger to life in inexperienced hands, for the asphyxial elements indicated above are exceedingly subtle in their appearance, and cannot be successfully eliminated unless their onset is perfectly clearly recognised in a very early stage. The fact is incontrovertible that chloroform alone is incapable of producing dangerous symptoms if the administrator be thoroughly versed in the clinical evidences of the various degrees of narcosis; but when depressing influences are added to the lower blood-pressure which it produces, a very slight change in posture, an attempt at retching, slight obstruction to breathing, or exposure to cold air with much hæmorrhage will extinguish the vitality which could otherwise be preserved.

Numerous instances are recorded also where the patient has succumbed before the operation has commenced. This may occur in two ways, by simple over-dosage, or by timid administration. The latter involves all the dangers and difficulties of a prolonged second stage. When a patient is allowed to vomit frequently while being anæsthetised, sufficient anæsthetic is not being given, and if this second stage be prolonged, as in many of the cases of reported fatalities, syncope may be induced from this cause alone. Unrecognised obstruction to breathing is, however, the chief cause of deaths in most chloroform accidents. Movements of the chest alone are not sufficient evidence that adequate respiration is proceeding. Each fresh breath must be either heard or felt by the administrator, and the holding of the breath during struggling, the delayed deglutition movements and entry of blood, or high-pitched crowing indicating partial spasm of the larynx must all be met by immediate treatment to clear the airway, because otherwise secondary syncope soon follows in their train.

A classical paper by Hinkel* records eighteen cases of death under chloroform administered for the removal of post-nasal growths, at the end of which he concludes that:—

(1.) Statistics show an exceptionally high mortality from chloroform anæsthesia in the operation for the removal of lymphoid hypertrophies of the pharynx.

(2.) The observations of the Vienna pathologists show that sufferers from "adenoids' frequently belong to an abnormal constitutional type that has been found peculiarly susceptible to chloroform narcosis.

(3.) In view of the statistical and pathological data presented, the general use of chloroform in the operation for hypertrophied tonsils or naso-pharyngeal adenoids is inadmissable.

These opinions are very clearly expressed, and appear somewhat dogmatic in view of the general resort to chloroform in the English country districts. It is difficult, however, to refrain from holding the view that if some such mixture with ether as that which has been described above were more usually adopted, those whose experience is only moderate would be administering a far less lethal vapour than that of chloroform in these particular operations.

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* "New York Medical Journal," October 29th, 1893.

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